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The Man Young at Fifty

THE CAPTAIN OF INDUSTRY AS A SELF COMMANDER.

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Philadelphia, Pa.

The American captain of industry is the rare product of an age of crude and somewhat cold-blooded efficiency. Upon him must we rely more than on any other agency to win the war of man as a citizen, versus man as a mere unit for organized selfishness. His, also is the privilege and obligation of reorganizing later the world's crippled and vitiated industries. Thus he is the one modern necessity as well as blessing.

The primary attributes of this captain of industry are, in the main, superb. His acquired qualities—the better ones—are admirable often requiring amendment in spots; his weaknesses are those of his type and circumstances. A peculiar tendency is to put in careless and culpable jeopardy his own chief assets, the integrity of the stock of health, his available potentialities.

As to his self jeopardizing traits I beg to offer a word of fond, admiring admonition from a full heart and some experience in conservation and repair. Later a word of counsel will be offered as to behavior, mainly by analogy and inference. Let me first direct attention to his outstanding characteristics, as the epitome and exemplar of that peculiar efficiency which he typifies so handsomely.

I.

The captain of industry must be preserved and conserved at all costs. On him rests the cosmic burden of turning the destructive currents of world forces from old, wasteful channels safely and serenely into streams of beneficial influences dug by the sweat and tears and blood of centuries of slow straining effort of each one to get on in the world better than some one else.

The successful American man of affairs is supposed to "know his way about," in and out and back again; also how to execute at need a thoroughly shrewd retreat. It is true "perpetual peril hath made him insensible to fear." An unending series of victories gained by dash, effrontery, quick, dominant judgments, soon or late obtunds his sense of caution so far as his personal saefty is concerned. He ceases to realize, if he ever admitted, that his fashioning is merely of perishable clay like the rest of us; subject to the same laws of compensation and adaptation; it shows the same vulnerable areas if subjected to undue strains, prolonged impacts, or to insidious infections.

As a matter of fact the mortality of these supermen, these human dynamos, is extra-ordinarily high though they are picked men, "a selected group" of prodigious vigor, of valor and of endurance, as well as of penetrating intelligence.

There are in these United States, so it is estimated, five hundred thousand citizens who have earned the rating of captains of industry. They form the backbone of the industrial system, the foundation of the social hierarchy. They are unique products of the overstimulating conditions of our amazingly resourceful country. A survey of the history of these supermen, however, shows a pathetic shortness of life.

Is this untimely destruction inevitable? By no means. I beg attention to some significant facts and their causes. The reader may then draw his own conclusions.

Among these facts are such familiar examples as the following:

In a certain summer resort frequented by me for twenty-five years, many famous captains of endeavor made themselves palatial homes; and each year are found an increasing proportion of their widows. Many of these ladies are frail; a few are chronic or "nervous" invalids; yet all survived their more robust husbands. Among these husbands were many who realized the importance of conserving their vigor; took excellent care of themselves, possessed abundant means for gratifying commendable tastes, yet just as they had settled down to a life of ease, directing their energies into diverse beneficent channels, out they passed into the "great majority."

Why did these splendid citizens thus suddenly die at the zenith of their careers, or in the early twilight of well earned repose? Could their lives have been spared for the fruition of purpose? Undoubtedly. What was the one fault common to all; what economic error did each one commit? An *arrogant but natural over-confidence in their own judgment about themselves.*

Now had their judgment been consulted about the welfare of their colleagues, or associates, of mere acquaintances even, most likely they would have given soundest advice. Alas! they could do this for others but remained blind or stubborn to their own interests. In a word *the captain of industry is too often a miserable failure as a self commander.*

II.

Briefly the fundamental causes of premature aging, untimely decrepitude, or pathetic ending of these citizens was—*they one and all are kinetically over-driven.* We all realize, you may say, that the bearing of heavy responsibilities for years must result in some such fate. Quite true; it is no novelty. We, who hold a brief for special pleadings at the bar of survivals, are ever sounding our warnings. Sometimes we are commended for so doing; then again we are sternly rebuffed, told we exaggerate; or most often are derided as "calamity howlers" according as the mood finds each.

The most we physicians can expect is the oft recurring statement, when making a personal appeal, *"My dear* sir, what you say is doubtless quite true as you see it; you mean well. I heartily coincide with your general statements, but you fail to appreciate the fact that I am just as wise as you are, as fully aware of truths which seem significant to you who are only familiar with sick persons. That is your business; it is your duty to make these statements strongly. In this instance I have brought your tirade on myself by having consulted you, but *you know nothing of business.* You can know nothing of the peculiarly big business in which I am 'the bright particular star.' This is a realm far beyond your limited ken. Don't presume to invade it with your tallow dip. You need an arc light to penetrate *these* depths. You wouldn't know what you found if you did see. Certainly you couldn't *interpret* my infinite resources and complexities. Hence you had better take your fee; you have done your duty, and be gone. I know myself; I know my needs and how to take care of myself."

III.

My reply is now to be set forth succinctly. Let him who reads disprove it if he can; if not let him take heed lest he be another to fall tomorrow as better men have done all up the line of history.

As a cogent argument to sustain our familiar appeal to the captain of industry, to show the unsoundness of that wisdom in his own interests with which he so generously credits himself, I will offer the picturesque, incisive parallelism of a surgeon, Dr. George W. Crile. He has gone to the root of a matter common to all lines of human conservation, he makes particular application in solving the perilous factors among candidates for surgical operation. I will take as example the man of exceptional capacities, extraordinary capabilities, inherent and acquired, who has achieved distinction in any chosen line of endeavor. He, more than most, has made efficient use of his latent powers; has "made good" by intensive effort, by shrewd judgment, by eternal vigilance, by audacity, by all those qualities in short, which by common consent lead one to the top in any enterprise.

Such a man is equipped with an inexhaustible fund of energies of which he is the highly elaborated transformer and transmitter. He becomes much more, he is his own "speeder up." He must, (or he believes he must) continue to maintain the acme of pace in order to get the lead and maintain it against all competitors. He scorns all warnings for the (to him) excellent reason that each and every one of those with whom he competes also do the same or they "lose out." Moreover they—inferior men too—can and do seem to stand the pace and the one who holds on longest and strives hardest "wins out." Hence to talk to such a superman of slowing down when in the zenith of his vigor and trained facilities is "rank nonsense." Now to work hard, to make the fullest use of one's powers, to keep at it early and late is one thing; to "speed up" and keep to the highest concentration level for long stretches, through good and bad conditions of market, of domestic worries, of personal ill health, is quite another.

Since the process of "speeding up" is identical with that of the transformation of potential into kinetic energy, the state of increased energy transformation might fittingly be called the "kinetic drive."

IV.

It is my purpose to give a short, graphic, but I hope comprehensible, idea of what this "kinetic drive" is, and to show how it inevitably affects the highly differentiated human organisms; how it imperils the vital foundations and how these dangers can be avoided.

The complicated machinery of civilization created by man often drives him to his own destruction. This is peculiarly true of those who assume the task of deliberately attaining larger successes than others; who feel qualified to reach the top and stay there. Nor is it merely intensive striving which tends to destroy, it is the *dogged persistence of stress while temporarily disqualified by anxiety or by disease.* Of course some anxiety is inevitable in all competitions, but it depends on the kind rather than the degree; also in particular on the altered powers of reaction or over-sensibility present which varies with circumstances.

One of the gravest causes for the "kinetic drive" is some form of infection, any one of the transmissible diseases, especially when the sufferer cannot, or will not, adequately rest till balance of power is restored. A cogent yet familiar example is the lightly esteemed "grippe" or influenza. It is estimated that the ultimate destructiveness of influenza is far in excess of any of the more dreaded and graphic contagious, including Diptheria, Scarlatina, Pneumonia or even the Plague.

This brings us to one working rule:

More nails are forged for one's coffin by refusal to obey the urgent direction to rest during, and while convalescing from, transmissable diseases than from any other cause. Call to mind how often you have sneered at "the overcautious sawbones!" Oh! yes, you survived and may survive again. But you did run a dangerous immediate risk of heart and kidney damage and did get a scar on your vital mechanism somewhere which acts as a shortner of life. Add many of these together and off comes several years of "life expectation." Now if you will permit a little more technicalities and scientific reasonngs, they should serve to fortify the foregoing assertions.

V.

The Kinetic Mechanism: Man is a mechanism, an automaton, whose life is maintained by means of a system of organs especially adapted to this end. In these organs is stored during sleep the energy which during wakefulness is transformed into movement, into heat or into such representations of muscular action as in feeling or thinking. This storage process is due to responses from contracts with surroundings, with distance, with chemical vibrations, and the like.

"The impulse or driving force which sets up this transformation of energy within the organism is supplied by certain parts of the brain, and in the brain is found

also the mechanism which makes the final manifestation of the transformed energy specific to the environmental contacts (things happening all about us in daily life) "which initiated the driving."—(Crile).

One further brief quotation I make and then in plain language offer convincing grounds from his elaborate researches on animals showing the exact effects of infections and emotional strains. Precisely analogous are these to what occurs in humans from similar whips used in kinetic over-driving.

"The organs, which from moment to moment vary and control, accelerate or retard the driving force of the brain are the suprarenals (little bodies lying on top of the kidneys), the thyroid (the pacemaker of the kinetic system) and the final act of adaptive energy transformation is performed by the muscles."

NOTE:—The primary process within the brain, by means of which driving forces are created and sustained is oxidation. Oxygen is supplied by the lungs, whereby the qualities of the blood, the vital fluids are sustained at the right degree of alkalinity. If the blood be too acid, its forces won't work economically. This balance is maintained by the liver, the kidneys and the lungs. If all these parts act as a unit and there is complete rest (as ample sleep) a series of definite economic processes, conditioning work and health, is maintained. If they are over stimulated, irritated, harassed, then self formed poisons accumulating (leucomains) are not reduced to forms which are readily extruded, and a uniform series of morbid changes take place in the structure of these vital organs; they suffer damage, more or less permanent, the nature of which is known and is capable of demonstration. (See C. E. de M. Saiores: "The Internal Secretions." 2 Vols).

Enough has been indicated, however, to show we are daily accumulating exact detailed evidence as to the how, where and why. Accumulations of damage occur in the life sustaining and life regulating organs from precisely the kinds and degrees of "insults" which the captain of industry invites on himself by disregarding admonitions based on the age long experience of competent physicians.

VI.

The point I wish to emphasize is that *an excessive kinetic drive may be the result of the simultaneous action of a number of factors arising from within or from without, or both,* and that safety lies only in learning what can and should be done to limit or modify them to a safe degree. Each one must learn where his own danger point lies and resolve to check or modify these evil influences, not only as far as possible but whenever these causes begin to act. The aid of an expert in this domain is essential. No man can know of his own feelings what these danger points are, when they begin, nor how much damage, immediate or remote, may ensue. Among the damages may be sudden loss of mental balance, of dethronement of judgment whereby interest collateral as well as personal may suffer. Acts may then be performed which imperil reputation, as well as efficiency.

The big industrial leader has learned to do so many things well, that his vanity induces him to do far too many useless and exhausting things. To be sure a man trained to accomplish much by close attention to both a broad grasp and skillful arrangement of time and effort can "put over" many jobs important to others, and if he can and does do this and escape the reaction of anxiety or destruction strain, it is a pleasure and profit.

He owes it to himself to omit overdoing, wrong hurtful, uneconomic doings. Unless he does determine unflinchingly to avoid errors in the way he works, to overcome bad habits of frantic over-stress, his machinery will go to smash in vital centers. These damaged spots accumulate, honeycomb his capital of energies, till suddenly the whole mechanism becomes disintegrated. There is rarely much self evidence of this; no plain warnings, till the injury is beyond redemption. The whole man suddenly goes to pieces like the "one hoss shay."

This pathetic spectacle is only too common. Success in world competition seems to create, or be accompanied by, a perilous *delusion of personal exemption* from the fate so common to others. Thus any busy physician meets those who are conspicuously rushing too near the precipice, and who contemptuously reject advice or warnings. Some do fly over the brink and go out in a brilliant splash; others and many too, become pitiably and prematurely senile, mere wrecks of their former selves, charges on their families.

VII.

Here are a few reasons why the superman of industry has no right to jeopardize his mature working efficiency. By the time he has reached his zenith, his maximum, he has in many instances broadened along other than his own special lines. He has outgrown the narrower limits of industrial or financial pursuits. With advance of years he has acquired mature judgment in also yet larger fields of endeavor.

Brain dynamics tend to flow into collateral and varied channels. From a simple instrumentality has become a complex, a highly differentiated one. He thus becomes a trustee of powers ripe for usefulness in the domain of citizenship, sociology, philanthropy and statesmanship. He now belongs not alone to the community but to the Commonwealth. No man lives unto himself alone, and especially is this true of the superman. Above all he should achieve wisdom enough to realize the mandates of human limitations.

The very training he has undergone has changed his perspective. The captain of industry sees things in the large; he has lost sight of petty details, among which are weak links in his own vital chain.

Earned usccesses come largely by protracted intensive effort; doing all in one's power "and then some." Habits are formed of keeping always keyed up; to the point of bursting with exuberant energies.

These may be suppressed by intensive effort; *both an over push forward and an ever pull back;* thus the expenditure of force is doubled and wasted. A sense of duty is formed to surpass his earlier efforts, to enjoy the sensation of tingling with vibrant action all the time.

Even while sitting still at one's desk and concentrating attention the surging energies drive blood pressure to the maximum. No normal outlet by movements then compensates, hence body and brain cells are both chronically poisoned. Or again he is not content to make occasional assaults on difficulties but hurls himself recklessly into whatever breach opens. *He does all the posisble then attempts the absolute impossible.* This constitutes a very splendid exhibit of prodigality; it is magnificent as a crude example of insensate pride, or crass arrogance, or intoxication of pugnacity, but it is not good business. It is not an evident of economic judgment.

The orgy of energizing leads to only one eventuality: bankruptcy of forces. For youngsters it is uneconomic; for the "landstrum" it is fatal. Continuing the analogy consider the significance of the medical arm of the service in war. Judged on a strictly business basis it is admitted that in modern warfare the medical arm is on a full par of adjuvancy with the fighting arm. The health of the man who carries the gun, who digs the trench or aviates the blue, is of paramount importance. Let us continue to argue in terms of business.

From one angle of psychology it is just as fatal for the medical advisor to run counter to business concepts as to impugn the delicacy of woman. This new type of soldier of progress is jealous of his reputation as well as of being a knower and a doer of all things. He claims the capacity to decide promptly and with finality on what he terms "common sense." Any suggestion that contemplates removing this all wise type of man from his post of duty, his trusteeship, even for the purpose of saving his life, he brands as "absurd;" giving up, taking a rest, as a puerile overcaution.

VIII.

The superman sees things in the large. To stop his work he claims will throw out of gear organization of 100 or 1000 other men. Keep this before the mind: *It is not often necessary to stop work but to wisely modify personal methods.* He is accustomed to having "his will be done;" he thinks, acts, decides for himself, permits no dictation, right or wrong. This torrential energy, cyclonic determination, often enough leads to right decisions and, if to wrong, many errors are submerged, lost sight of in the rush of circumstances; the effects of mistakes are swept aside.

As to the protesting "sawbones," he is often mercilously grilled. If his advice fails to tally with the big business man's crude conception of "common sense" (wholly ignorant as he is of scientific facts, causes or consequences), it is scornfully rejected and the superman triumphantly sails on to the rocks and is engulfed.

Verily the captain of industry is a pitifully incompetent self-commander in perilous seas!

I close with a brief remark on one simple and efficient means by which this imminent fate can readily be avoided. Alas! that so few will either read or heed! All we expert guides in behavior ask is that the superman shall *apply reasonable principles of "system" or "business"* here as he would elsewhere; that he should take counsel with medical experts as he would with his legal counsel, or his expert in any particular line, as of chemistry, of finance or other special domain closely allied to one's intimate interests.

Lesions of Joints in Cerebro-Spinal Fever.

Arthralgia, or pain in the joints like that of influenza, is common at the onset and in the early stage of the disease. but is often overshadowed by the more severe symptoms.

Arthritis, or more often synovitis, is a recognized complication of cerebro-spinal fever, and may occur in meningococcic infection without meningitis, and in such cases has sometimes been regarded as "peliosis rheumatica."

The incidence was estimated at from 10 to 15 per cent. by Sophian, and from 5 to 20 per cent. by Roger, but among 502 cases in the navy it occurred in 24, or 4.8 per cent., and among Fairley and Stewart's 323 cases in 23, or 7 per cent. Among 902 other cases there were 59 cases of synovitis, or 6.5 per cent. It is more often seen in adolescents and adults than in babies, thus recalling the incidence of synovitis in acute rheumatism; but when it does occur in babies the hands and feet are specially picked out, whereas in older patients the larger joints—the knees, wrists and ankles—are usually attacked. In posterior basic meningitis Still found periarticular infection, the joint cavities being healthy in 4 out 49 cases examined after death, and Osler, in his Cavendish lecture, said the lesions were generally periarticular.—(*Brit. Med. Jour.*)

Bacillary dysentery is susceptible of clinical recognition in a high proportion of cases, and even in the absence of blood and mucus from the stools. It is important that the clinician should acquire a knowledge of what are the suspicious features of the disease in order that he may eliminate cases for laboratory investigation.

General Scientific

THE OLDEST THOUGHT IN THE WORLD—NEW THOUGHT.

GEORGE F. BUTLER, A. M., M. D.
MEDICAL DIRECTOR OF THE NORTH SHORE HEALTH RESORT.
Winnetka, Ill.

"New Thought" is not new. It is the oldest in the world. Mental healing dawned with the dawn of history—the first medical practice of mankind. Physical medicine is a new-born babe in its swaddling clothes. Accepting this—and it cannot be denied, we must, also, agree that new thought or old is relative in its efficacy to the mental ability of the subject to act upon its organism. And results must differ as mentalities differ, and they differ widely. Plato said that a man's root is in heaven; and, we must agree to this—even though we know that a man's sphere of action is upon earth. Together, root and branches constitute unity—are interdependent, each upon the other. The spirit builds the body, and the body houses the spirit. They must live helpfully, in harmony, or they fail and fall. Intelligent conception accepts and agrees to these facts by its knowledge of them. Ignorance knows of them merely as facts—without philosophizing as to why, or what, they are. To understand the why and wherefore of these relativities is to know how to use them. To merely be conscious of them lacks the faculty of intelligent application of cause and effect—the peril of miscalculation—the danger of misuse. The end and aim of life, its study, its effort, should be the truth. And the truth shall make man free.

The basis of "New Thought" is the incontestable fact that mind controls matter, whether the matter be of the outer world, the world of earth and rocks and trees and water, or whether it is the matter composing the body of man. In the very early days men had only the observation of their naked eyes to furnish them with data, yet even these sufficed to prove that objects of sense, like the body of man, were not fixed quantities as they appeared to be, but were fluid, and governed more or less by mind—how fully they did not know. But they knew enough to provide them with a working principle, a principle which we now name "suggestion," and they performed great feats by aid of it, not only in the case of disease but in multitudinous directions. Among the oldest glimpses of mankind that have come down to us, the healer-priest or medicine man is a prominent figure, seated wrapped in a blanket and mumbling mystical incantations over a sick man. And the sick man was often cured, if he had faith enough in his medicine man. The currents of the mind were flowing then as now, and the obstructions to its stream were of the same nature.

The foolish incantations of the priest gave the patient confidence and aroused his interest, distracting his conscious mind from his troubles and filling it with other and more pleasant thoughts. In fact this early healer's principle was practically the same the psychotherapist employs today. Some of these healers were honest and some dishonest, as men are now. They had learned that patients recovered under such treatments, though what performed the operation must have been a matter of varying opinions among them. They knew nothing of the benevolent mind-stream, as we know it now. That was not recognized by man until physicians discovered the natural recuperative power which exists in the body and called it *vis medicatrix natura*. The healing

performed on a patient's body by this power would be seen and speculated on, but what chance was there for these early speculators to discover the truth? None whatever. Yet the cause had to be ascribed to something, and choice would naturally fall upon the mystical words. The fact is there is probably as much mystery today regarding the question as there was then, to those who have not studied the subject. Philosophers understand it and physicians understand it, and scientists and many modern ministers; and they are all of them endeavoring to teach the uninstructed. Also there are many unprepared persons who, for one reason or another, usually either to make money or to find a cure for their disease, have entered the field and are doing in it just what the quacks are doing in any field of medicine. They know nothing, and care to know nothing, of the high things involved, and in a foolish repetition of phrases they have learned by rote and do not comprehend, prove their relationship to the incantationists of old.

There are records in the earliest histories to show that suggestion, in some form or other, was then known and practiced, and that many and singular devices were employed for conveying it.

Crystal gazing, which was used by the early Egyptians, formed one of these devices. The healer or prophet, gazing intently into a crystal ball, would pretend to see there, and would describe, certain pictures which he wished to impress on the mind of his patient or questioner; and there were other uses to which the crystal was put, acting always as a mode of suggestion.

In Persia dreams were employed in like manner, such laws of interpretation being invented as to impress the dreamer with the ideas desired by the priest. The Chaldeans were especially famous for their supposed powers of dream-interpretation.

At the Greek temples the priestesses went into trances, induced sometimes by fumes of burning drugs, sometimes by emotional frenzy, and by these arts of suggestion impressing their questioners.

In Rome the diviners read prophecy in the entrails of slaughtered animals; and omens, interpreted skilfully by the priests in the most trivial occurrences, were highly regarded. In fact these or allied practices were prevalent throughout the ancient world.

The power of suggestion was in constant operation by healers, politicians, priests and others. Though every nation, and probably every tribe, in the primitive world knew something about it, none of them ever developed the idea far enough to make possible a system in which cause and effect might be traced, explained and formulated. But the middle ages, whose whole ignorant length was packed full of every kind of charlatanism, mostly founded on this power of suggestion, finally produced the first faint glimmering of a coming scientific light.

It was not a real light of science. In fact it was very far from being that. But in looking back now we can see that it was the actual beginning of that which has developed into the system we call psychotherapy. The author of this embryo system was Paracelsus. In 1530 he published a book based on the supposed influence of the Zodiac on human life, and dealt at some length with the question of suggestion in its crudest forms.

Paracelsus was a quack, but he wrote in a manner that attracted considerable attention from his contemporaries, and made his book a classic in its field. It must be read by every student in his search for learning, up to this day. What he wrote in that book has its chief interest for us in the fact that his teachings, crude and even hideous as they were at times, formed the base from which empiricism might step a little higher. It was two hundred years making that step, for the times were full of all kinds of fantasies, of false scientific theories for healing disease, prolonging life, gaining wealth and power, and pilfering immortality.

Cagliostro was one of the leaders of these impostures, claiming supernatural powers, and working sordid mysteries through tricks made possible by suggestion. Grassner, a priest had great success in healing supposedly by supernatural aid. Kircher, Makwell, Santanelli, Van Helmont, wrote books filled with trash about many things, the properties of the magnet forming a prolific source of wonder-mongering among them. But finally the step was taken (to carry out my figure of speech), and it came down hard on Frederick Anton Mesmer and animal magnetism.

Mesmer, was an educated physician, born in Austria, in 1734. He took up a theory already voiced by his predecessors, and carried it a little farther under the name of animal magnetism. This, he declared, was "a quality of animal bodies rendering them susceptible to the influences of heaven and earth." In order to demonstrate it he at first employed the magnet in his healing, but did away with that upon learning that the same results might be obtained by mere use of the hands in making passes before the eyes of his patients; and it was not long before he found that any inanimate thing on which he laid his hands would act apparently with equal power. This led him to believe that the human body contained or generated a fluidic force which had certain properties, and that by touching the patient the doctor established the necessary connection for the flow of the healing fluid. For more than ten years he practiced with varying success in Vienna; and then, in 1778, went to Paris, where he jumped into popular favor, his parlors being constantly crowded with patients. In fact his business grew so great that he was unable to attend to it in person, and so, by laying his hands on a tubful of broken glass or other rubbish he permitted that to act in his place. And it did so act! At least, thousands of patients came to it sick and departed well. Of course we are able to see now what performed this wholesale healing, but at the time it was supposed to be the "magnetic fluid," for that was the only appearance of the suggestion that was visible to the uninstructed eyes of the age.

Mesmer made such a stir that the French government appointed a commission to study these phenomena, and our own Benjamin Franklin, then our representative at the French court, was a member of it. Besides the governmental inquiry, another was begun by the Royal Society of Medicine. These observers found that no effect was made on the patient unless he knew that he was being treated, which was significant enough, but failed of proper interpretation nevertheless. A woman was blindfolded then, on being informed that the magnetic force was being directed against her, she began to manifest the usual symptoms accompanying magnetism. But when she was really treated in the usual way, without knowing it, she manifested nothing! After a sufficient number of experiments, every one of them showing similar results, the commission made an unfavorable report, ending with these words:

"Finally, they have demonstrated by decisive experiments that imagination apart from magnetism produces convulsions, and that magnetism without imagination produces nothing." This meant only fakirism to the

commission. The members never dreamed that they were so close to a wonderful truth, and gave up inquiry right there.

This was the beginning of the end for Mesmer in Paris, but he had created a great furor there, the spread of which was world wide. Discredited, he left the city, practicing his theories in other places, and sure of the truth of them until the day of his death. And he had builded better than he knew, for he gave a fresh impetus to the inquiry into suggestion, which though he had named it "animal magnetism," began to be called Mesmerism after his death; and out of the study so instituted arose hypnotism.

The origin of this practice is generally ascribed to the Marquis de Puysegur, who in his experiments with Mesmerism found that a certain patient would when "magnetized," fall asleep, and that while in this condition he could be moved by oral suggestion. In that state he could be made to think whatever was wanted—that he was happy, that he was sad, that he was attending a festival; he also could be made to laugh, to cry, and so on.

It was claimed he could diagnose diseases and prescribe for them, and when he awoke he remembered nothing of what had passed. Incidentally he was healed of his own disease.

The marquis naturally made much of this new train of phenomena, and the wonder of it spread. The practice offered so many opportunities for quackery and money getting that it fell as by force of gravitation into the hands of the same class of mind that had so foolishly juggled with its possibilities in the middle ages. Among these that have come down to us are the names of Dr. Pititin, a physician of Lyons; the Abbe Favia; and Deleuze, a naturalist. Deleuze, who is awarded the credit of being among the really honest and sincere workers in this line, declared that faith was necessary in working the principle, and for this insight he is highly complimented, though Paracelsus had said the same thing long before him, and Braid was supposed to have discovered it after him. But even Deleuze was a long way from the truth.

For many years after the course taken by suggestion was almost exclusively that which is called hypnotism, a kind of sleep induced by suggestion, and originating with the experiments of the Marquis de Puysegur. It took this course in France, Switzerland, Russia, Italy, Germany, Denmark, and other countries; but now it was employed a little more reputably, namely, by physicians in the cure of disease. Dr. Bertrand, of Paris, in 1820, delivered a full course of lectures on the subject. Then physicians began hopefully to employ it experimentally on hospital patients, but were thwarted in their endeavors by the patients themselves, who seemed to think it was the finest thing in the world to deceive their doctor in this matter, leading him to think that he was commanding them when he was not. But enough success was attained to attract attention of the Academy of Medicine to the subject in this new form, and in fact five years were given to it, the results of which was the following report:

"The results are negative or insufficient in the majority of cases; in others they are produced by weariness, monotony, or by the imagination. It appears, however, that some results depend solely upon magnetism and cannot be produced without it." And it set the seal of medical authority on it by adding, "These are physiological phenomena, and well established therapeutically."

Still ignorant of the existence of the healing mind-flow, they ascribed its phenomena to whatever seemed to them the most likely cause. You see how persistently we may, even the wise and skilled among us, overlook a thing that is right before our eyes, constantly trying to attract our attention. It is our own education that we see expressed around us, in all things. We cannot see what we have not grown up to.

Mesmerism now became so popular in France that it was practiced by all sorts and conditions of men, who invented foolish by-paths for it, such as communication of thought by one person to another without material means, and the ability to see by aid of the back of the neck instead of the eyes. These and other fantasies which were employed for five or six years by the wonder-mongers aroused the Academy of Medicine to further action, and in 1837 it made still another investigation, which resulted in its refusal ever to consider the subject again. It did, however, later.

In England, James Braid, a surgeon in good standing, interested by some exhibitions given by Lafontaine, a Swiss magnetizer, began experimenting, soon coming to believe that the results of mesmerism were due to psychic and not physical causes. It was he who invented the name, "hypnotism," and substituted it for "mesmerism." This he did because he believed that the secret of the whole astonishing matter was a kind of induced sleep in the subject, "hypnos" is the Greek for sleep. It was Braid also who first put the inquiry on a truly scientific basis, by directing it along the lines of observation and experimentation, with the truth in view. From this time onward the subject becomes hypnotism, and enters the field of science, though Braid was himself as fantastic in some of his theories as any of his untrained predecessors had been.

Braid stated, and doubtless believed, that he could by pressure on the different phrenological "bumps" on a hypnotized subject's head, induce in him different mental states, corresponding to the bumps pressed. He says that he bound a cork on a man's head over the organ of veneration, and then hypnotized him; that the subject then clasped his hands in adoration, took on a look of veneration, and knelt down as if in prayer. Braid moved the cork forward, and the patient "manifested active benevolence;" he pushed the cork back, and the patient again showed veneration. We know now that Braid was deceived. The thing could not happen as he thought he saw it happening.

But Grimes, of New Orleans, made a discovery that very nearly brought the truth to light, for he proved that in some persons hypnosis was not necessary; that the subject was as susceptible to oral suggestion without hypnosis as with it. This really should have put the hunters on the right trail, but did it? Not at all! Instead of going straight ahead from this point the matter wandered away from the line of advance into bypaths as foolish as ever. But it persevered, and in time, in 1850, it got a hearing before Congress. The results of this event we hear little about, but it is certain that the practice of suggestion in some form or other spread widely in the United States. At that time it was called Electrobiology, and under this name was carried, by Darling, to England, where it was immediately recognized as the same old hypnotism with which the people there were familiar, and which now, under the name of Braidism, had become very popular. Ten years later Doctor Gros a Frenchman published a book which he called "An Outline of the Theory and Practice of Braidism," wherein we are able now to see important indications, but at that date it made no stir. However, a surgeon by the name of Azam, of Bordeaux, and his

friend Broca, who lived in Paris, made many experiments for the purpose of demonstrating the value of hypnotism in surgical operations, and achieved some success in the extraction of teeth, lancing abscesses and the like, inducing anesthesia by hypnosis. These favorable results attracted the attention of the Academy of Science, and many physicians of the best standing examined the subject and wrote on it.

In 1866 Liebault, founder of what has been one of the most famous schools of suggestion in the world, published his book, "Sleep and the States Analogous To It, Specially Considered in the Action of the Mental on the Physical." In this work the author gave form and authority to the laws of suggestion in healing, which had been so long employed unconsciously and in ignorance of its very existence. Thus he became the founder of the mental healing as it is practiced today, not only through induced sleep and oral suggestion, but through oral suggestion alone. For more than thirty years he worked at Nancy, treating thousands of patients, and making a convert of Bernheim, who joined him in his work, out of which has grown the great clinic now known as the Nancy School of Suggestive Therapeutics.

I might, before leaving this history, mention a few among the many medical men who have given signs of understanding, or faintly apprehending, the principles underlying mind-healing. Hipocrates himself, who is commonly regarded a founder of the present medical system, and who lived about 400 B. C., plainly realized that medicine was not all, that there was a psychical element to be reckoned with. Then there was Celsus, who, in his expressed belief that the physician should be also the friend of the patient, and should always present to him a cheerful demeanor and countenance, gave proof that he realized a certain value in suggestion. Also Galen advises care of the soul by the physician, as well as of the body, recognizing the influecne of the moral on the physical. LeCamus, in 1753, published a book to which he gave the suggestive name, "Medicine of the Mind." DeBeauchene declared that there was a medicine of the mind, and that it was of special worth to women. Tissot describes the vaccillations of mind in patients, and recognized the need of an air of confidence in the doctor, which, imparted to the patient, even without medicine, might operate more effectually than complex remedies. Pomme, in his treatise of 1783, shows knowledge of suggestion in his remarks about the attitude of authority which is necessary to the physician with his patient. Lauret went so far as to advise reasoning with the insane, and he may not have been so far wrong as some seem to think. Lasegne, in 1847 produced a remarkable book in which he ably advocated moral treatment of disease and gives indications of a coming system of "re-education," or suggestion. At about the same time Brachet appeared with his book on hysteria, the treatment of which, he declared, should be mostly of a moral kind. There was also Charpignon, who emphasized the part played by the mind in healing disease. Hack Tuke outdid them all when he produced his book, for it detailed all the known facts regarding the influence of the mind on the body in disease. And there are Professor Bouchard, Ribot, and many others, among whom may be named Pierre Janet, who has written a bulky book of much importance; Camus and Pagniez; the "Isolation" specialists Breuer and Freud, with their "Studies in Hysteria;" DeJerine; Oppenheim: Munsterburg; Joseph Jastrow; Gulick, of New York; Walton of Boston; Cabot, of Harvard University; and Professor Putnam of Harvard.

This does not by any means complete the list of modern writers on the subject, but I have gone as far as need be. You can see what a vast web of mental healing is woven about the body of mankind for its good, whether mankind knows it or not.

We have learned how old this so-called "New Thought" is; how psycthotherapy began; how crude it was then, and yet that it healed, even against the profoundest ignorance; we have seen it making its way down through the ages, never understood but always efficacious when given the right conditions for its flow; we have seen it join hands with medicine of the lower types and rise to the somewhat dubious heights of hypnotism; and we have seen it emerge from hypnotism unharmed and still hand-in-hand with medicine, a medicine now of the higher type.

The whole history, from the beginning, naming all the cults and teachers up to today would require the biggest book ever written. The world is full of it now and always has been, because the principles are synonomous with life itself and must be practised by all persons, knowingly or unknowingly, wisely or ignorantly. There is a cult for every grade of mind, a cult adapted to the understanding of each adherent who naturally thinks that he has the true one. And he has. For it is the only one he can comprehend, and it is based on the true principle from which all spring. It will heal many of his diseases, or prevent him from acquiring them; it will make him happier and more contented; and it is his sole avenue of approach to spirituality.

GAS GANGRENE IN WAR WOUNDS.

A Plea for Radical Surgery.

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It is not the intention of the writer to go deeply into the subjects of pathology or bibliography in this paper as there are extensive works written on the subject. And not wishing to presume on the reader's time and patience, I have selected what appears to me a resume of the subject over which there has been and will continue to be a great deal of controversy.

During the time of the American drives of the past year I was situated in a large operating hospital on the Western front. During this time I had the opportunity of studying a large number of gas infections. I hereby wish to acknowledge the great assistance rendered me by our bacteriologist and pathologist, Captain Crawford of Richmond, Virginia.

Incidence.—The Incidence of bacteriological gas infection was 32 per cent. of all gun shot wounds in the A. E. F. Please let me state here that bacteriological gas infections did not mean necessarily gas gangrene. In a large proportion of mixed infections the first bacteriological examination showed the presence of gas bacilli as a contaminating organism; about 25 per cent. of these showing evidences of clinical gas gangrene.

Bacteriology.—This would depend upon the type of soil where wounds were sustained. The terrain around St. Mihiel and the Argonne Forest, seemed to be favored locations for the production of gas, while the British front around Arras, Soissons, and in Belgium, produced more tetanus and less gas. The *b. welshii* or *b. aerogenous capsulatis*, was without doubt the predominating organism. In the traumatized wound were found a great variety of bacterial flora complicating this infection. The *b. malignant edema, proteus vulgaris, col. communis* staphylococcus and streptococcus. The *b. psuedo-edematis maligni* was not positively identified.

The vibrion septique of Pasteur was identified in 11 per cent. of the cases. It especially occurred in the massive fulminating types in conjunction with the Welsh bacillus but not as a predominating organism. The *b. Perfringens* occurred consistently in about 75 per cent. of infections in conjunction with its closely allied types which are regarded as morphological varieties of the same groups, as the following would indicate:

1. B. Aerogenous Capsulatis (Frankel)
   (a) B. Hibler 9th.
2. Vibrion Septique (Pasteur)
   (a) Ghon-Sachs 2nd.
3. B. Proteus Vulgarus
   (a) Hay Bac.
   (b) Colon Bac.
   (c) Typhoid Bac.
   (d) Para-Typhoid group.
4. B. Tetani (Kitasato) 10 per cent.
5. B. Spirogenes (Metchnikoff)
6. B. Perfringens
   (a) B. Seudo-Edematis
   (b) B. Fallax
   (c) B. Histolyticus

I would regard the *B. Hibler* 9th as identical with Frankel's bacillus and Ghon-Sachs 2nd the same as the vibrion septique with possibly a few cultural changes.

Etiology—Location.—The calf of the leg, thigh, buttocks, fore-arm and chest wall, were the most frequently involved in the order named. Gas infection seems to have a special predilection for compound comminuted fractures with inadequate drainage and especially in muscle groups where some of the "mutilations" of muscles and skin were done under the guise of debridement, a yard of gauze being then stuffed and packed very tightly in the destroyed muscle area, thus creating a perfect medium for the production of gas gangrene. Another very important factor was the destruction of blood vessels supplying the involved area. Often times a gun shot wound penetrating the calf would have a complete debridement down to the bone without regard for muscles, blood vessels, or nerves. The streptococcus and the staphylococcus were consistently present as contaminating organisms. The most important factors contributing to gas infections are:

(1) Contamination of soil, clothing, etc.
(2) Shell wounds invariably.
(3) Foreign bodies, such as shell fragments, bullets, dirt or clothing.
(4) Length of time elapsing between infliction of wound and primary treatment.
(5) Injury to blood vessels and the application of the tourniquet.
(6) Compound fractures, especially of leg, thigh and forearm.
(7) Great tissue mutilation and degeneration.
(8) Injuries to joints with a septic arthritis with or without attending fractures of the limb.
(9) Gas organisms growing and becoming exceedingly virulent in presence of myosinogen in muscle tissue.
(10) Inadequate drainage in fractures, especially with closure of tract of the missile.

Pathology—Microscopic.—The muscle sheaths are studded with minute hemorrhages with an infiltration of leucocytes. The smaller blood vessels are obstructed and fibrous tisuse around muscle sheaths are impregnated with round cells. Infiltration follows muscle layers or fibers and may not invade bundles within close proximity. Organisms are rarely found in the process of extension in the round cell areas. Later there is an invasion of the lymph spaces and the muscle fibers for short distances only. The wound proper abounds in the contaminating organisms but the extension of the process shows gas organisms exclusively.

The blood vessels and the area immediately surrounding them favors the growth and extension of the bacilli. A destruction of sarcolema comes first followed by invasion of the myolema. The first stage of extension along the blood vessel sheaths is marked by an absence of leucocytes. The muscle fibers become separated early and are swollen, bleeding very freely. The neuclei in the sarcolema are destroyed early in the process. Early engorgement of the capillaries with free blood cells in the process.

Gross Pathology.—The muscle groups involved may show widely different types of gross pathology. The muscle groups are translucent, flabby, and bleed easily. Elasticity is greatly diminished. Gas bubbles are present between muscle bundles upon pressure. The muscle sheath may be pale, and later dark in color and studded with gross hemorrhages. The muscle is noncontractile, and has a peculiar red color distinctive in itself. The skin later becomes involved over the infected areas with enormous swelling of a shiny and peculiar dark reddish brown color characteristic of the infection. Peculiar egg shell crackling is present which becomes more pronounced as degeneration takes place. If incised, gas escapes which has the appearance of blood bubbles. The importance in extension of infection is that it has a special predilection for muscle groups primarilly and skin infection is entirely secondary.

The primary wound usually shows extensive destruction, discharging a bloody fluid which has a peculiar foul odor; oftentimes there is a localized necrosis which complete disintegration of muscle tissue. Post Mortem examination shows beginning hyaline degeneration associated with cloudy swelling. The internal viscera when incised shows the "foamy organs" so clearly described by Welsh.

The Blood Picture.

1. A generalized gas septicemia.
2. A bacteremia in some cases (about 10 per cent.).
3. Hyperinosis.
4. Leucocytosis of the polyneuclear variety.
5. Round cell infiltration.
6. Profound secondary anemia.

The cases of bacteremia showed invariably on culture the Welsh bacillus alone.

Types.

1. Localized abcess.
2. Acute toxic form.
3. Massive fulminating type.
4. Mixed subcutaneous infections.
5. Chronic types showing symptoms after wounds are practically healed.
6. Septicemia type with multiple abcesses.

Clinical Course.

The early symptoms of gas gangrene are those of acute infection of any other type. The question of early shock being more pronounced in this infection has been raised, but personally I do not believe it due primarily to gas infection but to the wound itself. The symptoms of course bear a direct relation to the size, location and nature of the wound.

Edema.

It is usually localized and primarily due to trauma; later it becomes the etiological factor in the development of gas infection.

Symptoms in the Wound.—The tissues early lose their elasticity and assume a reddish brown discoloration. There is a sero-sanguineous bleb formation which when ruptured shows a straw colored or reddish brown fluid. Swelling at this stage becomes marked and extension rapid. The character of the secretion is reddish brown, slightly purulent, thin and has a typical fetid odor of gas infection. This odor appears early and the character of the discharge is suggestive.

Symptoms—General.

The primary symptoms are headache, malaise, rapid pulse, slight fever, and more or less continuous pain. These symptoms are augmented by extension of the process the fever reaching 105 to 106 and pulse is 120 to 140 or even higher, out of all proportion to the fever.

Secondary stage—This stage is characterized by:

1. Production of gas in the tissues.
2. Egg shell crackling.
3. Successive crops of bleb formation.
4. Discharge becomes more profuse and darker in color.
5. There is a rapid extension of Edema, blebs and reddish brown discoloration of muscle tissue and skin.
6. Pulse becomes more rapid and weak.
7. Definite changes in the circulation such as vascular thrombosis, local areas of necrosis, slough and destruction of the muscle.

General Symptoms—Second Stage.

1. The patient complains of severe headache, is extremely restless, and in the later stages active delirium may be present.

2. Anorexia, and in some cases nausea and vomiting.

These symptoms last from 12 to 24 hours, at the end of which time in grave infections they become highly augmented. The final stage is characterized by a gradually increasing delirium which finally merges into profound coma, from which it is difficult to arouse the patient. Oftentimes he stares into space not unlike the type of coma in typhoid fever. The symptoms are at this time those of an overwhelming intoxication. The fever often rises to 106 and the pulse is uncountable. At this stage sudden death is prone to occur.

Diagnosis.

1. In military surgery all gun shot wounds are looked upon with suspicion, especially if they are deep wounds associated with necrotic tissue.
2. Characteristic reddish brown discharge with odor.
3. Most frequently in compound comminuted fractures associated with foreign body.
4. Signs of profound intoxication accompanied by high fever and rapid pulse.
5. Presence of baccilli in blood or pus culture.
6. X-ray in cases which are fairly well advanced shows a characteristic light area following the track of the missile. The affected muscles show irregular spots and striations. In the later stages these spaces are clear, well developed and quite extensive. These changes are absent in muscles which are gangrenous without gas infection.

Prognosis—Depends Upon.

1. The location of the wound and the extent of tissue destruction.
2. Whether or not blood vessels have become involved.
3. The prolonged application of the tourniquet.
4. Type of drainage and time at which instituted.
5. Length of time elapsing between infliction of wound and primary treatment.

Although 32 per cent. of all gun shot wounds showed bacteriologically gas bacilli of some type; only about 25 per cent. of these showed active gas infection.

Treatment—Prophylactic.

1. Rapid transportation after wound infliction to primary dressing stations.
2. Thorough cleansing of the wound and surrounding skin area with the application of iodine and provision made for drainage.
3. Removal of disintegrated muscle tissue as completely as possible.
4. Early removal of the tourniquet.
5. Institution of Carrel-Dakin's solution as early as possible. This I believe to be the most important prophylactic measure if proper technique is employed.

Treatment—Primary.

1. Removal of foreign bodies such as bullets, shell fragments, clothing, splinters of bone and blood clots.
2. Removal of all damaged muscle tissue and control of hemorrhage. A wound packed to control hemorrhage invites gas infection.
3. Mechanical cleansing of the wound and surrounding area. This may be accomplished with gauze swabs, iodine or bichloride 1-2000 irrigations.
4. Placing of Dakin's tubes, the number corresponding to the size and depth of the wound. (The administration of Dakin's solution to be started at the earliest opportunity).

When clinically established:

1. When the infection is established clinically with low temperature and has not as yet become extensive, or when localized abcess forms, wide, multiple, incisions longitudinally with the muscle sheath, followed by separation of the muscle sheath down to the bone and the introduction of Dakin's tubes, combined with control of hemorrhage, gives a fair amount of success. These incisions must be kept open with large tubes or the swelling and pouting of the muscles may close them.
2. Localized application of the actual cautery followed by iodine or solution bichloride 1-2000 irrigations is exceedingly helpful in the early stages. The irrigations should be repeated at least every four hours until temperature falls and the wound begins to clean up. When the case is received and these measures carried out the first 6 to 8 hours there is a high percentage of cures (85 to 88 per cent.).
3. It is important that one search for deep hemorrhage and control same if found. If a localized necrosis is present it should be removed by excision or cautery.
4. Muscle group excision—This has been in my experience a fair prophylactic measure. It is only possible in localized types with involvment of one or more muscles within a circumscribed group. If the circulation is impaired or will become impaired by this proceedure, it will not arrest extension of infection and it may seriously interfere with the function of the limb later.
5. The introduction of peroxide of hydrogen or injection of oxygen into the tissues is of course an absurdity, being only another one of those "surgical dreams." Having failed signally they have been relegated to the discard where they rightly belong.

6. The bone fragments which have become detached and which may later lead to necrosis should be removed completely. Under no circumstances should a constrictor or packing of any kind be applied to the wound or limb. Drainage, drainage, and counter-drainage is, I believe, the first prerequisite.

Carrel-Dakin's Solution.

Carrel-Dakin's solution with proper technique should be instituted early and continued until the wound is sterile as far as bacilli are concerned. This is one form of infection in which this solution holds the "balance of power." Under proper management, the bacilli, in favorable cases rapidly disappear, although the streptococcus or staphylococcus as the contaminating organisms may not be affected at all. The dressings should be lightly applied and vaseline gauze placed upon the surrounding skin areas. The wound should be closely watched after the first 24 hours of Dakin's solution, for secondary hemorrhage not infrequently occurs during its use. The drop method, combined with 2 hour "floodings" should be employed.

Amputation.

Personally I believe we have been far too conservative in this respect. The expectant treatment in the massive, fulminating types, is in my opinion disastrous. When a gas bacteremia or a profound septicemia is present a few hours' delay combined with the conservative temporizing methods means the death of the patient. Amputation in a rapidly extending type of gas infection, or where the general intoxication is severe, I believe to be a life saving measure, and should be resorted to earlier and more frequently than we have done heretofore. Those cases of gas infection associated with compound fractures of the limbs showing mutilation and great destruction of tissue should be amputated at once. Those cases with gas infection of the forearm associated with compound fracture, great edema, and having bacilli in the wound, should be given the benefit of a shoulder disarticulation (open) without delay. The same is true of the tibia and fibula, the amputation being above the knee and without skin suture. The open amputation with flaps reflected is the operation of choice. It has the advantage over the French surgeons' method of "flush amputation," in that the limb requires no secondary amputation, and can be readily closed with skin suture alone after the patient has recovered. Multiple deep incisions beyond the amputated area is in the majority of cases good practice, in that it provides drainage above and has a tendency to prevent further extension of infection. It is poor judgment on the part of the surgeon to close tightly with suture any case of amputation for gas infection where there is even the slightest suspicion of edema or discoloration.

Serum.

Weinberg, Sequin, Laclainche, and Vallee, have prepared sera for use in this disease, but as yet the results are only fairly successful in a limited number of cases. The type of sera to be effective or curative must contain besides the Welsh bacillus and vibrion septique, all of the secondary gas group as well as the streptococcus of the polyvalent type. In conclusion let me urge early and radical amputation as the successful treatment in advanced cases of this much dreaded disease. By this measure alone can we hope to deal successfully with extensive gas infection. A live man without one arm or leg is a better man and of more use to society than a dead man who was not given the benefit of "Radical Surgery."

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GAS GANGRENE.

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Without doubt the small number of gas gangrene cases in Base Hospital No. 61, A. E. F., was due to the fact that the cases arrived after debridement at some evacuation hospital. Debridement can well be called prophylaxis and in this, the most treacherous of all wounds, surely saved many lives. In this hospital thirty-two cases were identified and all of this number were placed on the critical list upon arrival. Mortality was high, 50 per cent, but when the prognosis of the disease is considered, we feel, with these, even chances were all that could be hoped for. The saving of 50 per cent can well be attributed to the taking of wound cultures, the constant watch that was kept of all cases where gas gangrene was found or suspected, the use of serums and the untiring efforts to keep all wounds clean and freely drained.

Gas gangrene was the most formidable and frequent form of grave infection of war wounds in the hospital. The number of cases developing or arriving at the base hospital depended largely on the extent to which cases could be properly debrided at the hospitals near the front, and also the interval elapsing between time of being wounded and the treatment. Consequently in time of great action at the front, when all faculties were taxed to the utmost, the proportion of cases of gas gangrene was very high.

Gas gangrene is a pathological condition produced by infection of wounds with certain organisms, of which the anaerobes are the essential factors. It is not a clinical syndrome like angina, but its manifestations, bacterial etiology are as varied.

The character of the wound is of primary importance in determining the development of gaseous gangrene by anaerobic infection. Organisms causing this condition will not develope in living tissue, therefore any injury with extensive devitalization of tissue forms a suitable pabulum for their growth. This is especially true in case of muscular tissues, because of its richness in sugars and proteins. These predisposing factors are found in (1) crushing or extensive laceration of muscle as in case of wounds caused by shrapnel or shell fragments, (2) injury to blood vessels resulting in impaired circulation and consequent devitalization. The tourniquet was for this reason thought to be a factor in predisposing the condition, (3) where hemorrhage into tissues had occurred, thereby forming favorable culture conditions, (4) bone injuries were very prone to gaseous infections, because of deep location providing anaerobisis and because of the extensive laceration of muscle tissue caused by the spicules of bone.

In regard to the infection, one finds that the essential organisms are found normally in the intestinal tract of animals. As the heavily fertilized fields of France were the battlefields, it is very obvious why anaerobic infection resulting in gas gangrene was so frequent.

In the classification of gas gangrene, that of the French authors, Wienberg and Seguin, in *La Gangrene Gaseuse* Monographie de L'Institute Pasteur will be followed, which is given below:

I. Classical or emphysematous form.

In this form there is an extensive infiltration of gas gangrene more or less extensive. The skin presents usually a brownish tint. Vesicle formation is apparent.

This form is produced by the following organisms, either alone or, usually by two or more; B. perfungens, vibrion septique and B. perfungens, B. Perfringens, B. oedematiens.

II. Toxic or edematous form.

The edema is progressive and extensive. Gangrene is sometimes very marked, sometimes slight, sometimes totally absent. The skin is pale and distended. The superficial veins are distended. Crepitation is absent or slightly perceptible. There were no vesicles observed. The organisms, or combination of organisms, found in this type are: B. oedematiens, B. perfungens,

1.—Section of the thigh (amputation). Note marked edema and necrosis.

B. oedematiens and B. perfungens, B. oedematiens, vibration septique and B. fallux.

III. Mixed form.

In this form the edema and emphysema are both very marked and the bacterial flora is very diverse.

IV. Putrid form.

This form resembles the other varieties, but has an extreme putridisity added. This is caused by further infection with putrefactive anaerobes. The most important of these is B. sporagenes. These organisms are in themselves non-pathogenic, but greatly augment the process which is also infected by the pathogenic anaerobes.

The bacterial flora is very variable and extensive. Both anaerobes and aerobes play an important rôle. While no case of gaseous gangrene has been produced according to Wienberg, alone by aerobes, they are very important by their association with anaerobes. It has been observed that combinations of certain aerobes and anaerobes or several anaerobes, produce conditions far more grave than when they occur singly, or in other combinations. This association is another instance of bacterial symbiosis seen in other pathological conditions. Examples of these are:

(1) Streptococcus in combination with the anaerobes was always far more grave than an anaerobic infection alone or associated with other aerobes.

(2) Staphylococcus associated with anaerobes was dangerous in cases of bone injury.

(3 Proteolytic organisms like B. coli and B. proteus always added to the gravity of the process.

(4) B. Pyaceous intensified all forms of gas infection.

(5) Among the anaerobes combinations were also important.

(a) Association of several of the chief organisms was always more grave than when occurring alone.

(b) A class of putrifactive anaerobes of which B. sporogenes is a type, invariably produced serious cases.

The organisms isolated in case of gas gangrene are so numerous that it does not seem feasible to incorporate all. Suffice it to say that about twenty-four anaerobes have been recognized by various bacteriologists. Wienberg names six anaerobes as most important, and with which he has experimently produced gas gangrene. These are: B. perfringen (Amer. B. Welch), B. oedematiens, vibrion septique, B. sporogenes, B. fallox, B. aerofoetidus.

Among the aerobes most frequently found are: (1) cocci, represented by the streptococcus, staphylococcus, pneumococcus, and enterococcus. (2) the gram negative organisms are represented by B. proteus, B. coli and B. pyocaneous. (3) the gram negative organism is represented by B. anthracoides and B. cutes communis.

The deleterious action of the living body produced by these organisms is by the toxin which they secrete. B. perfringens, vibrion septique and B. oedematiens produce very virulent toxins.

The pathology has already been alluded to, but we will present here the picture seen in cases coming to autopsy at Base Hospital No. 61. There were sixteen necropsies performed on cases of gas gangrene. This was the total number of deaths from gas gangrene in a total mortality of forty-two following gunshot wounds. Among the cases dying of gaseous gangrene five had been amputated and nine had been badly debrided.

The cases autopsied at this hospital always showed gas infiltration; some very extensive, others to a less extent, but always the predominating factor was emphysema. Necrosis was always extensive. None approaching strictly the endematous types were observed, although edema was always marked.

A synopsis of an autopsy protocol will suffice as a typical example as seen in the morgue of this hospital.

Autopsy No. 229, Serial No. 2847232.

2.—Amputated thigh showing gas gangrene. Note cone of infection and necrosis with apex pointing proximally.

Clinical record—Wounded October 25, 1918. Shrapnel penetrating left thigh. Wound, lateral to femur, no bone injury, large and lacerating. Muscles of upper lateral part of thigh almost entirely torn away, leaving a large gapping wound anteriorly and posteriorly. October 27, 1918, wide debridement. General condition fair until November 1st, when general condition became worse. The pain became intense. He had an anxious expression, had chills, body was cov-

ered with perspiration, pulse was small and rapid, the respirations were labored and rapid. The condition rapidly became worse.. Patient became apathetic and death soon followed. At the onset of the general condition the wound presented also marked changes. There was intense edema extending above the Poupart's ligament. Crepitation was palpable, gas bubbles could be expressed into the wound. There was a brownish discoloration of skin and wound showed a black slough. There was some yellowish white edema.

At autopsy the circulatory, gastro-intestinal and urinary systems showed no abnormal changes. There was some edema on apex of right lung and in interlobar fissure, otherwise the respiratory system was normal. The spleen was not enlarged, and the consistency and size was apparently normal. The liver showed slight yellowish discoloration of capsule, but microscopically no other abnormalities were noted. The thigh presented two large gaping wounds, one anteriorally, the other posteriorly. Edema was very marked from knee to Paupart's ligament. There was a brownish discoloration around wounds for about four inches. The surface of the wound was dark, nearly black. Crepitation was very striking. On section a large amount of serosanguinous fluid escaped from the sub-cutaneous tissue which was much thickened by edema and felt firm. On cutting through muscles there was a sound like cutting lung, due to the marked emphysena. The muscle appeared dark red, was very soft in consistency, and could be easily scraped out with the fingers three to four inches around the wound. The odor was quite putrid. Beyond the area of decomposition the muscle appeared edematous, and presented light pink color, or as frequently expressed, the "washed beef" appearance. Microscopically the internal organs showed no marked abnormalities. The lung showed edema. Myocardium showed no abnormality. The liver showed a slight amount of fatty degeneration. A section from the muscle presenting the "washed beef" appearance, showed a degeneration of some muscle fibers, lymph spaces widely distended. Marked infiltration between muscle fibers by polynuclear leucocytes.

Diagnosis.—Early diagnosis was the keystone of successful treatment, therefore all patients were taken to the operating room when they arrived at the hospital, for critical inspection and culture of wounds. In this way the bacteriological report of anaerobes could be obtained in twenty-four hours. The identification of the anerobes could be left until later, or as far as surgical treatment was concerned, was quite immaterial. With the knowledge of the character of the wound and the type of bacteria, cases requiring more radical surgical measures could be selected.

When patients showed the characteristic lesions, as have been described, the chances of successful surgical interference or other treatment were always very dubious. In fact, when the process was once well implanted a fatal termination was almost the rule.

Treatment.—Early radical surgical intervention seemed the only treatment of any value. Serum treatment was also used. Both the Leclainche and Vallee and Weinberg serums were used. The former was polyvalent serum prepared against B. perfringens, vibrion septique and the pyogenic organisms. A monovalent serum prepared against the B. oedematiens was used in conjunction with this. The Wienberg serum prepared at the Pasteur Institute was a monovalent serum. Sera against B. perfringens, B. oedematiens and vibrion septique were used. Procedure for serum treatment was as follows: In suspicious cases when first seen, twenty cc. of anti-Welsch, ten cc. anti-vibrion septique, ten cc. of anti-oedematiens were injected. If the case was in bad shape, double this dose was used, and also after operation. When the organism was identified only the anti-serum specific for the organism was used. In the polyvalen serum of Leclainche and Vallee, thirty cc. was the average dose. Whenever possible this serum was injected around the wound in the form of a barrage to check the advance of the infection.

Twenty cases were treated with serum in addition to the surgical treatment. All of the cases presented wounds very suitable for gaseous infection. All were infected with gas gangrene producing anaerobic bacilli. Five cases terminated fatally; fifteen showed no signs of gaseous infection later. Of the five that died, two died of streptococcus septicemia, one of endocarditis and meningitis, and post morten heoculture showed streptococcus in blood stream. None of these at necropsy showed any signs of gas gangrene at the site of the original wounds, in fact, they presented healthy granulating wounds. Therefore, of the twenty cases treated with serum, it seemed justifiable to state that only two died of gas gangrene.

No marked improvement in the patient's condition was noted following serum treatment in any case. In the cases dying obviously of gas gangrene, the process and general symptoms continued unaffected by the serum in spite of huge doses locally and intravenously.

Accurate scientific work was impossible at the time these cases were in the hospital due to the rush of work and lack of facilities and workers.

The evidence presented is too meagre and crude to merit drawing any conclusions as to the value of serum in the treatment of gas gangrene.

Judging from the general and very superficial observations, one would conclude that fewer cases developed gas gangrene after serum injection. Undoubtedly its value, like surgical treatment, lies in early or prophylactic use.

REMARKS UPON THE IRRITANT EFFECTS OF POISONOUS GASES IN WARFARE.

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There were 375 patients who suffered from the effects of gas treated in the medical wards of Base Hospital 61, A. E. F. In addition to these there were many patients who had been gassed whose wounds were of major importance and required treatment in the surgical wards. There were doubtless many patients in the general medical service who had been gassed slightly, admitted with other diagnoses, who were suffering from gas primarily and whose true condition was obscured by predominating grippal, bronchitic or gastro-enteric symptoms.

During the early days our lack of familiarity with the various types of gases resulted in the fact that in 175 cases the nature of the gas was undetermined. Since the evidences of mustard gas are so distinct, it is probable that nearly all of these were phosgene. Thirty-three others were suffered from phosgene poisoning. One hundred and twenty-six were mustard gas cases, four had inhaled a mixture of gases and one claimed to be suffering from arsene poisoning. One confusing element in diagnosis was the fact that soldiers in battle were constantly subjected to the inhalation of gases from high explosives and failed to recognize the fact that they had been gassed until they had become sick and could not describe the odor. Nearly

GROUP STUDY OF MUSTARD GAS WOUNDS.
1.—Old skin discoloration intensified by mustard gas.

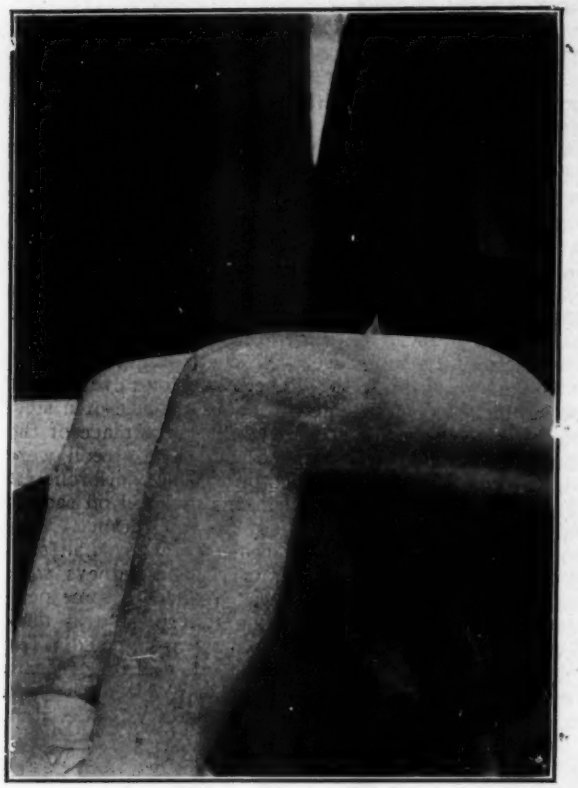
all our early cases came from the Meuse front. . Later trains brought various types from various places. One large "convoy" from the Argonne, nearly all of the 89th Division, were mostly mustard gas cases, with predominating respiratory symptoms.

There were only three deaths among these gassed patients. One was by accidental electrocution and gassing probably had nothing to do with his death. Of the other two patients who died, both had been exposed to mustard gas. The first patient to die was gassed October 25, 1918, received by us October 28th and died of broncho-pneumonia October 31st. Streptococcus was isolated from the lung. At autopsy the larynx and trachea were found covered with a thin membrane, which could be easily scraped off exposing an intensely congested mucosa. To the naked eye the mucosa seemed extensively ulcerated, especially along the vocal chords. The bronchi presented a similar condition, but lacked the ulceration. A large quantity of fluid escaped into the bronchi when the lung was squeezed. The lungs were very voluminous and presented a mottled external appearance. There was a marked roughening of the pleura over the posterior surface of both lower lobes, more marked on the right. In all except the middle lobe large consolidated areas could be easily felt. Pieces from these areas sank rapidly in water. Consolidated parts of the left lower lobe were soft and greyish and were apparently in a stage of resolution. The peribronchial lymph glands were moderately enlarged and very succulent. The pharyngeal mucosa was reddened and covered with a membrane. The esophagus also was reddened and the stomach showed reddened patches. The transverse colon showed small petechial hemorrhages. The same was true of the ascending colon. Beneath the hemorrhagic spots, the colon was much thickened. The rectum was congested. The other organs presented nothing of moment.

The second death occurred in a man who was exposed on September 29th for a long time, to so light a concentration of mustard gas that he was not aware of it until three hours later, when he began to vomit persistently. In our hospital his prominent symptoms were persistent râles, profuse expectoration, constipation and a varying temperature. At autopsy there was a slight congestion of the lower end of the trachea, more marked in the bronchi. The bronchi also contained a large amount of muco-purulent material. Both lungs were very voluminous and hypercrepitant throughout. They felt something like a feather pillow. On section, the lungs were air containing everywhere and were greyish in color. The bronchioles everywhere were thickened and dilated to about the size of a steel knitting needle, projected above the cut surface of the lung and exuded yellow muco-pus. The alveoli were dilated and contained muco-pus. The peribronchial lymph glands were very much enlarged and on section had a soft and succulent jelly-like appearance. The outstanding features of the heart were its small size, softness and mottled appearance. The kidneys were slightly injected. The liver was small with some perilobar degeneration. On section the spleen was dark red mottled with grey. The brain was injected. The first man presented on the whole the picture of death from inhalation of a corrosive poison, while the second presented that of death from absorption of an irritant toxin.

Fifty-two complications developed among our gassed patients, of which six certainly and four probably were not related to the gassing. These complications were:

2.—Old skin discoloration intensified by mustard gas.



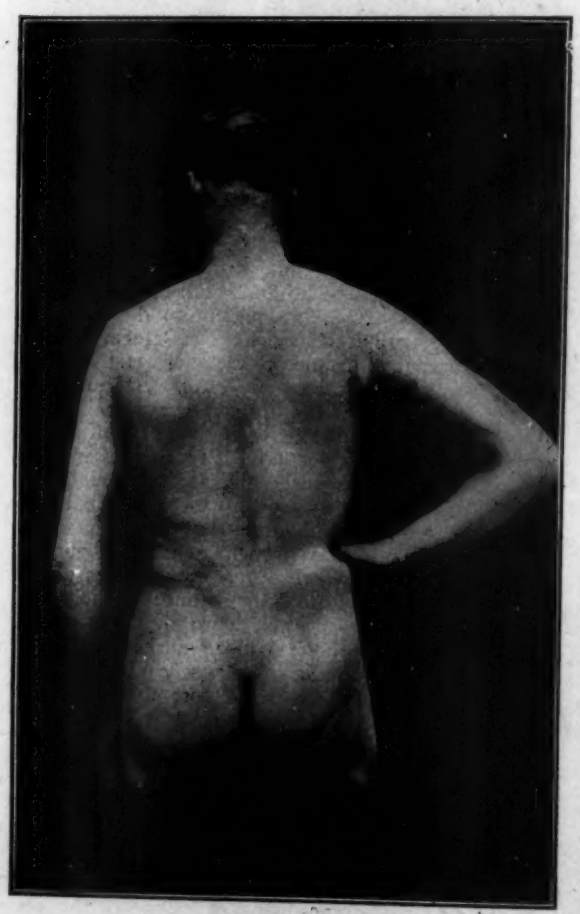
3.—Mustard gas burns.

neuralgia, sinusitis, jaundice, recurrent appendicitis, recurrent nephritis, and myocarditis. Including the doubtful cases this leaves us a total of forty-six patients with complications. Of these, one occurred in a mixed gas case and showed disordered action of the heart, and one in the doubtful arsene case (also D. A. H.). Of eight in the forty-one phosgene series, six had disordered action of the heart (two persistent weakness, probably D. A. H), one D. A. H. with neurosis), one persistent enteritis and one persistent cough. Among the 154 mustard gas patients, twenty-nine showed complications. There were 9 broncho-pneumoniac (one died), three influenzas (one of which was followed by broncho-pneumonia), three persistent coughs, one bronchitis (death), two bronchiectases, five persistent hoarseness, two persistent diarrheas, and five with severe persistent photophobia and plepharospasm. Among the 175 undetermined gas cases, there were twenty-three complications: six D. A. H., two persistent gastritis, two gastro-enteritis, three psychoses, two neuralgias, one influenza, one broncho-pneumonia, one influenza followed by broncho-pneumonia, and one frontal sinuisitis. These complications modified the usual course. Several patients presented more than one complication.

	Total.	Undeter.	Phosgene.	Mustard.	Mixed.	Arsene.
D. A. H.	14	6	6	0	1	1
Persistent Weakness	2	0	2	0	0	0
D. A. H. and Neurosis	1	0	1	0	0	0
Persist. Gastritis	2	2	0	0	0	0
Persist. Enteritis	5	2	1	2	0	0
Bronchiectasis	2	0	0	2	0	0
Purul. Bronchitis	1	0	0	1	0	0
Persist. Hoarseness	5	0	0	5	0	0
Persist. Cough	4	0	1	3	0	0
Influenza	3	1	0	2	0	0
Infl. and Broncho-pneu.	2	1	0	1	0	0
Broncho-pneumonia	10	1	0	9	0	0
Photophobia and Bleph.	5	0	0	5	0	0
Sinusitis	1	1	0	0	0	0
Neuralgia	2	2	0	0	0	0
Psychoses	3	3	0	0	0	0
Grand total	62	19	11	30	1	1

Among the symptoms one distressing feature was prominent, i. e., the utter lack of spunk displayed in patients who had been magnificent fighting men. Following their gassing, they were utterly broken in spirit. However, after several weeks this condition improved. When they left the hospital nearly every man had recovered his "pep," and was perhaps a little more savage than formerly.

Our cases presented nothing unusual in the way of symptoms. As far as we were able to determine, the prognosis is that reported from other hospitals and can be summed up as follows: Broadly speaking, the man either dies on the field or eventually recovers. However, the death rate in hospitals close to the battlefield is naturally higher than it is at the base. The lightly gassed recover on a few days. Men who on admission had considerable lung involvement were several weeks in getting well enough to get around comfortably. Even then they were somewhat lacking in "pep" and after moderate exertion or during damp, cold weather had a distressing cough. Eye symptoms proved obstinate and still remained in some instances when these patients left the hospital three or four months after admission.



4.—Mustard gas burns.

Patients who presented a neurosis or D. A. H., recovered from the other symptoms, but at the time of transfer from this hospital showed only slight improvement in the neurosis and the cardiac condition. As all our cases were evacuated within four months, we were unable to observe the ultimate condition of the very persistent cases.

The treatment of these cases is of especial interest. Our patients had all passed through various front line medical units. Our treatment at the base consisted almost exclusively of rest and warmth. The arrival of our nurses was followed by improvement in all the gassed patients. The patients first received were kept in bed possibly too long, but they made good recoveries and showed fewer complications than did the cases received at a later period. However, then we had mustard gas and influenza with which to deal. We were advised not to coddle these men, as such a course tended to produce, or at least to foster neurosis. Following this advice many patients were gotten out of bed very early and these men as a whole, it must be said, were somewhat delayed in their recovery. After three or four weeks they were no further advanced than men received later who were kept in bed for one or two weeks. Men who were up and around often had to go back to bed for a few days following light work, or a spell of cold, damp weather. And even in case of the convalescent patients a spell of cold, damp weather always brought on distressing cough and vague pains which in turn would yield immediately to sunshine, the resistent to medication. Of these patients who recovered slowly, several were detailed as K. P.'s and to do light work. Warmth and extra food produced noticeable improvement.

Nothing in the way of medicines seemed to do any good for the cough excepting large doses of opiates which obviously could not be kept up for weeks. The withdrawal of codein was followed by renewed coughing, which almost invariably was as bad as before its use. For that reason opiates were used sparingly and for short periods. Constipation was treated with salts, oils, or compound cathartic pills. Diarrhea usually yielded promptly to oil alone, or oil followed by salol.

The severe conjunctivitides were helped by the usual measures. Hot boric solution was good, but hot sodium bicarbonate solution was better. When followed by hot packs this gave excellent results. The eyes should not be bandaged, but should be left to "drain" freely. Irrigation should be frequent, even hourly. In the treatment of photophobia and blopharospasm the patient was forced to use his eyes as soon as the active inflammation had subsided. This course was attended with great suffering and the eyes healed slowly. Special cases were transferred to the eye department for treatment.

Other external irritating effects of poisonous gases especially burns from mustard gas, presented an interesting variety of skin lesions. They persisted to some degree for several weeks and many were intense after three months. Up to four months after exposure, a severely burned man can be recognized at a glance, because of the bronzing of the face and neck, blepharospasm, and slight redness of the conjunctives. Moderate discolorations gradually faded out and the more severe desquamated, usually in fine scales and occasionally in large flakes.

One man who was for several hours in a light concentration of the gas, presented a peculiar purplish brown discoloration, the only one of the kind seen. He was very toxic: cyanosis doubtless explained the purplish hue. Another soldier presented an eryhtema which persisted for four months. One blonde, who was severely burned, presented no discoloration, but desquamated in large flakes. The discolorations appeared mostly on dark blondes and brunettes. The brunettes showed the more intense colorings, the blondes tending rather to burn. However, many brunettes were burned and after severe gassing presented no discolorations.

The common discoloration was a general brown, very similar to an intense sun tanning, and was especially marked over the face, neck and forearms, but also extended over the chest, and occasionally down the abdomen and thighs. Intense discoloration was commonly observed in the armpits and about the genitals. In short, the changes occurred in the more tender parts, especially where moist or exposed. A great many men presented a mottled appearance, which is due to an irregular fading rather than to an irregular response to gas. One soldier who presented a patchy discoloration stated that these areas had been dark for several years, but had been intensified by the exposure to gas. The normal skin was not affected. When this man passed from my care, four months after gassing, he believed that the pigmented areas were much darker than they had been before his gassing.

The burns presented the appearance of thermal burns. Erythema was most common. Blisters were occasionally seen, and third degree burns but rarely. Blondes seemed to be more subject to burning; strong concentrations, however, affected brunettes as well. The genitals and axilla were the most common site of first degree burns. These gas burns seemed more painful than thermal burns of a similar degree. They were much more sluggish in healing, but when epithelialization started they healed quickly. Constitutional signs in these burns were lacking.

In the treatment of skin burns we used Yperite solution (sodium bicarbonate and hydrogen peroxide in weak, watery solution), with good results. Zinc oxide ointment gave about as good results, but our best results followed the use of zinc oxide ointment, with an admixture of sodium bicarbonate. These facts suggest the persistence in the tissues of a trace of the acid irritant (in the case of mustard gas burns) which is neutralized by the use of alkaline applications.

Emphysema.

In emphysema the chest becomes barrel-shaped (except in the senile type) and the costal cartilages rigid; so the chest walls assume their largest possible dimensions, the lungs lose their elasticity, the recoil of the chest walls and the intrapleural negative tension disappear. Consequently the only part of the respiratory pump which remains in action is the diaphragm, which is a very poor affair compared with the movement of the pliant chest walls; thus the vital capacity is much diminished. If the pump action be completely abolished the blood can only enter the chest under positive pressure, the veins of the neck remain full and tense even in inspiration and the right side of the heart does not receive any respiratory assistance. If you wish to retain a healthy chest you must maintain a good vital capacity, for which purpose pliant chest walls are essential; you must not allow any calcification of costal cartilages to take place. In the respiratory pump action which maintains the vital capacity the movements of the chest walls are equivalent to more than double that of the diaphragm. Every one should be taught chest breathing and leave the diaphragm to look after itself; it is an adventitious aid which will come naturally into play when required. In emphysema the difficulty is not so much in getting air into the chest as in driving it out; hence an elastic band worn moderately tightly round the chest assists expiration, and gives much work on inspiration, which helps to re-establish a negative pressure within the chest. This band should not be worn when asleep.—(*Brit. Med. Jour.*)

PAINFUL FEET.

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This almost universal complaint comprises several types into which it may be subdivided for the purpose of discussing the etiology, symptoms and treatment, viz., static, infectious and circulatory. Frequently the advice of the specialist is not sought until the painful foot condition has become chronic, and it is almost impossible for the patient to bear the body weight on the feet.

The examination of soldiers for military service has emphasized the fact well known to orthopedic surgeons that a large number of persons are suffering from painful feet, due to weakened muscles and ligaments and infections of the soft tissues.

Static foot conditions are generally classified as flexible or rigid, being either painful or painless. In the mind of the profession as well as of the layman, painful feet are attributed to relaxed muscles letting down the longitudinal arch. In actual experience it is found that much of the trouble is due to a breaking down of the anterior arch which causes severe pain in the ball of the foot, and when neglected over a long period results in the condition of anterior metatarsalgia. A large percentage of foot cases may be traced back to weak feet in childhood, when the relaxation of the muscles is brought about through lack of physical tone; or it may be the sequel of some debilitating disease as scarlet fever, typhoid, measles, diphtheria, etc. It is also found in children of poor muscular development, as in cases of rickets, malnutrition and similar systemic disorders. Foot plates, which are a permanent crutch, should never be prescribed for children. In adults the condition may be the result of occupation in the class of people who stand continually, such as motormen, elevator operators, policemen, salespeople, peddlers and nurses. A sedentary occupation may be the cause of a similar condition through atrophy of the supporting structures from disuse.

In all of the above there is a relaxed and weakened condition of the anterior and posterior tibial muscles, resulting in the letting down of the longitudinal arch producing the typical flat foot or pes planus, where the patient complains of pain about the arch of the foot and at the external malleolus, and falling of the anterior or transverse arch, giving a convex contour to the ball of the foot and pain at the metatarso-phalangeal articulations, particularly of the third and fourth toes. In this latter condition, when the head of the metatarsal bone impinges on the nerve, we have the condition of anterior metatarsalgia, or Morton's neuralgia, which was first described by Dr. T. C. Morton, of Philadelphia, in 1876. This is an exceedingly painful condition, like any neuralgia, but it yields readily to proper treatment.

In these cases of flat feet, due to the strained effort in walking, pain is often felt at the internal lateral ligament of the knee and sometimes, even in comparatively mild cases, at the hip joint. Pain may also be experienced in the small of the back and even between the shoulder blades, from the continued strain in trying to find a comfortable position in walking.

Another factor in the production of broken down arches are the shoes that fashion decrees must be worn. The narrow vamp and exaggerated point do not permit of the normal expansion of the foot in stepping—the normal foot is 1 to 1½ sizes larger when bearing the body weight than when in repose, and the small muscles and ligaments of the foot become wasted from disuse. In women the exceedingly high heel adds another complication, for by throwing the body weight on a compressed anterior arch, it is only to be expected that the arch will "give"—in this way accounting for the increased number of fallen anterior arches found in women.

Under a proper course of training for the muscles and with proper shoes, these conditions may be remedied and the foot made useful again. The exercises for the foot consist of flexion, extension, adduction, abduction and circumduction, or, in other words, going through the normal range of foot movements—similar exercises on the Zander foot apparatus—and having the patient go through these motions while resisting with the hand. Also have the patient walk on the toes and on the outer border of the foot.

The essentials for the shoe are that there be a straight inner line, broad toes, so as to allow the foot to expand in walking, and a heel with a broad base, either low or of medium height. The use of any sort of metal support or plate is most inadvisable, and especially so in the case of children, for they act simply as a support or crutch. The expression "once used, always used" may be applied here. Two pernicious results follow their use: First, in consequence of the fixation of the small bones the interosseous muscles become atrophied and the normal movements of the foot are interfered with; second, the hardness of the metal plate, and the friction attending its use; causes the development of callosities of the skin and periostitis of the bone. Padding the foot with felt, raising one border of the shoe so as to overcome the deformity, galvanic, faradic and sinusoidal electricity for stimulating the muscles of the foot, massage of the supporting muscles of the foot, are also important in the treatment.

After a careful investigation of the cases coming to the Hospital for Deformities and Joint Diseases, complaining of painful foot conditions, it has been found that more than 50 per cent are the result of infections. In some of these cases the infection may have resulted only in weakness of the muscular and ligamentous structures, while in others there is a chronic involvement of the soft tissues and periosteum. Infection in the feet may be secondary to general systemic infection as grippe, pneumonia, typhoid, etc., or to focal infections of any part of the body as teeth, gums, mouth, throat or nose, etc. Dr. Lovett, in his report of 800 nurses of the Massachusetts Hospital, suffering with painful feet, brings out this idea when he states that "the onset was frequently after grippe, tonsilitis, or acute illness of one sort or another."

When the inflamed foot is neglected or not properly treated, the inflamed, agglutinated surfaces fuse together and we have the fused or rigid foot in which there is no motion between the small bones. This type is most unsatisfactory to treat. The best results have been obtained by heating them in dry air at a temperature of 250-400 degrees F., by means of an electric baker, and then giving manipulation and massage in addition to the treatment for the exciting infectious process. The following cases are a few typical examples of focal infection:

Case I—Infectious arthritis from infection of the gums. Mr. F. H., a detective, referred by Dr. Austin Holles, to the Hospital for Deformities and Joint Diseases, complained of painful and flat feet. For two years previous he had been treated for his painful feet by various types of foot-plates given him at the advice of different physicians. In the past three months the pain had become so acute that it was impossible for him to get about without the use of a cane, and he was incapacitated from attending to his work. The appearance of his feet made one suspicious of an infectious arthritis. The Wassermann test was negative; the agglutination test for gonorrhea was also negative. An attempt to determine the focus of infection revealed infectious pyorrhea of the roots of several of the teeth. As this resembled the type of case in which symptoms have been benefited and relieved by sterilization of the gums and cleaning up of the deposits in the roots of the teeth, this method of treatment was pursued in this case. Although the arch had decidedly broken down and the X-ray showed evidence of the infectious process, after two weeks' treatment, the patient's symptoms of pain had all disappeared and four months later he reported that he was able to attend to his business and was entirely free from pain; he also had discarded his arch supporters and his cane.

This is an illustrative case of many which have been relieved of all painful symptoms after the sterilization of the pyorrhea infection:

Case II—Infectious arthritis of the feet from infection of the tonsils.

M. S., aged 28, bookkeeper, with no venereal history, does not drink spirituous liquors, smokes one dozen cigarettes daily. About six weeks previously patient had an attack of acute tonsilitis; about two weeks later the feet were painful and swollen; a few days later the swelling subsided, but the pain continued and grew worse. Owing to the pain and difficulty in walking he was referred to the Hospital for Deformities and Joint Diseases by his family physician. Examination revealed the tonsils inflamed and enlarged and the patient was referred to the throat specialist of the institutttion, who concurred in the opinion that the throat was undoubtedly one of the sources of infection. The patient was then referred back to his family physician, with our opinion and the advice that the tonsils be removed. This was subsequently done at the hospital. For the next two days there was increased pain and tenderness in the feet which gradually subsided, and for the past three months the patient has remained well and is free from all pain. The microscopic examination of the tonsil showed streptococci.

Case III—Infectious arthritis of the feet, following hemorrhoidectomy.

A. O., age 29, lithographer. In June, 1917, patient was operated on for hemorrhoids. Three weeks later had severe pain in left ankle and noticed swelling. Ankle was incised on both sides and discharged pus. Healing was delayed and diagnosis of the angle was made by four surgeons. Ankle was put in a plaster cast with windows; did not heal and amputation was advised. Case was seen at this hospital in September, 1919. Wassermann, Von Pirquet and tuberculin tests all proved negative. According to patient's history, in November, 1918 a fragment of bone about one-half inch in size was discharged from ankle and three weeks later it healed. At present there is stiffness but patient is able to walk and has no pain. Rectal examination reveals the following condition: Anal canal shows that hemorrhoidectomy was performed and a large area of mucous membrane was removed, so that a large area was exposed for infection, which was transmitted to the ankle.

Infectious Arthritis of the Feet from Non-gonorrheal Leucorrhea.

There is a special class of infectious feet found in married women between the ages of 20 and 40 that is of great interest. Patients are negative to Wassermann and Nagouchi tests and also negative to the agglutination tests. There is a vaginal discharge and an eroded and often lacerated cervix. We fail to find gonococci in repeated smears. The feet are slightly swollen, tender and painful to walk on. We have been able to cure a number of these cases by antiseptic douches of bichloride and iodin solution. The following case is illustrative:

Case IV—Mrs. B., age 32; married at age of 22; had three children and no miscarriages. She had some vaginal discharge following the birth of the second child, five years ago, which continued after the birth of last child two and one-half years ago. No increased temperature or illness after any of her confinements. For the past two years she has worn arch supporters for painful feet, with little relief of symptoms. When patient was first examined here her feet were somewhat swollen and very tender when walking. There was a suspicion of Niesser infection from their appearance; several examinations were made of the discharge, but no gonococci were found. Her husband denied venereal history; an examination of his urine and prostatic secretion was also negative. Patient received vaginal irrigation with 1-5,000 mercuric chlorid solution three times a day. In five days the symptoms in the feet began to improve, and in two weeks had all disappeared. The patient has gone about in ordinary shoes without arch supporters, and has remained well ever since.

Gonorrheal Infections of the Feet.

In considering the various causes of painful feet consideration should be given to cases of Neisserian infection because of the large percentage of people who acquire the infection. Uniform agglutination fixation tests should be made in cases of acutely inflamed feet. Roentgenography reveals the rarefaction of the bones and the presence of spurs. The trouble in the feet may appear in the first week of the infection, or it may appear years later from a focus in the prostate and seminal vesicles in the male, or from the tubes and ovaries in the female, producing periostitis, bursitis and spurs. Cases V and VI are striking illustrations:

Case V—Mr. M., proprietor of a drug store, had feet which were painful on walking and on pressure, tender and swollen. He had been treated by various physicians for two years with all foms of anti-rheumatic treatment without any benefit. His feet had the appearance of Neisserian infection. At this suggestion to the doctor, both the doctor and the patient became very indignant, as the patient had been married eight years, with two healthy children. At first the patient objected to examination, but later consented. A large inflamed right lobe of the prostate was found, and in the secretion expressed and sent to the laboratory, active virulent gonococci were found. Under appropriate treatment, massage of the prostate and protargol irrigations, the pain in the feet entirely disappeared and the patient made a perfect recovery, and is able to go about in ordinary shoes.

Case VI—Man, age 23, chauffeur, had gonorrhea at the age of 14. Owing to a painful heel at the age of 18, an X-ray was taken, which showed spurs; he was operated upon and spurs removed; pain was not completely arrested and a second operation was performed, when the pain disappeared, for four years, but reappeared. He applied at this hospital. History of last attack of pain in the heel dates back two months, when he began to suffer pain in both heels, extending over malleoli; arches weakened, movement limited, especially dorsal flexion and adduction. Examination still shows presence of gonococci. X-ray revealed a new outgrowth of bone over the area previously operated upon, also spurs. Under the treatment for the gonorrheal infection and the removal of the spurs, the symptoms cleared up.

Tubercular Infections of the Feet.

This is found most often in children, appearing gradually with some swelling and pain, local tenderness on pressure, and the child shows a slight limp. Later the swelling increases and there is breaking down of the infected area. The X-ray shows rarefication and breaking down of the small bones; the Von Pirquet is generally positive, and an excess of acid-fast bacilli is found in the feces. A great many such cases have been cured by the building up of the general health of the patient and soaking the affected foot in hot water for one hour three times a day. We thus obtain a primary hyperemia from the hot water, and a secondary one when we replace the water pressure of 62½ lbs. to the square inch, by the atmospherical pressure of 16 lbs., thus keeping up the hyperemia for some hours.

Syphilitic Conditions of the Feet.

Periostitis and osteitis of the bones of the foot and gumma of the soft parts are found in congenital and later acquired syphilis, in which there is pain and great

local tenderness, and which, if properly treated by asyphilitic remedies, does not break down, but on delay we may have to resort to surgical procedure. As aids to diagnosis we have: 1, patient's history; 2, finding the spirocheta pallida; 3, the Wassermann test; 4, X-ray, showing (a) periosteal thickening and (b) uniform bone shadow of compact and cancellous tissue, on which a diagnosis may be made in the face of a negative Wassermann. For the treatment of syphilitic bone conditions, an intravenous injection of salvarsan is given and repeated every seventh day, from three to six injections being given, after which inunctions of blue ointment are applied daily. If evidence of salivation appears the mercury is discontinued for a time.

Gout.

The causes of gout have not yet been positively ascertained, for there is still a doubt as to whether it is due to defective elimination of the urates themselves; or, on the other hand, whether it is a disturbance of the purin bodies, which will later result in the formation of combinations of urates. The clinical entity called gout is brought about by the sodium biurate and other imperfect combinations of uric acid deposited in the tissues. There is no doubt that all the small joints are affected with gout, but the most frequent location is in the joint of the great toe. Pain, swelling, redness of the toe and an inclination to keep the foot elevated are the characteristic symptoms. The internal administration of colchicum does not change the amount of urea eliminated, and there is a decrease in the excretion of uric acid, but there is an almost instant relief of symptoms after its use. In acute cases involving the smaller joints or even the knee, three treatments in 36 hours of cataphoresis with fluid extract of colchicum have been known to relieve all the acute symptoms of swelling, pain, etc.

Obliterating Endarteritis.

A great many of these cases are seen at this hospital and it is found almost exclusively in Russians, Poles and Galicians. The subjective symptoms differ in intensity. They are intense pains in the toes and feet, sometimes extending up the leg, increasing at night when they are often so intense that the patient cannot sleep. He may have to let his feet hang out of bed, or sit up in a chair in order to get a little sleep. He is unable to walk more than a "half block" on account of a cramp in the calf of the leg. The pressure of the shoes adds to the pain and many of the patients wear some sort of soft, felt shoes or swathe the foot in flannel.

The objective symtoms are:

1. The patient walks with a distressed gait resembling painful flat feet, for which he is often treated.
2. The feet appear blue, congested and syanotic, but the pressure of the hand and manipulation of the foot elicit little pain.
3. The sensitiveness to heat and cold is diminished.
4. The skin has the clammy feeling of death.
5. The pulsation in the dorsalis pedis and posterior tibial arteries is either absent or decidedly enfeebled.

The pain is not so great in warm as in cold weather and the symptoms, although gradually growing more severe, may extend over a period of months or years. In severe cases there is a type of atrophy of one or more toes, a darkening of the skin with dry gangrenous appearance, but differing from other forms of gangrene in the slowness of its progress. In some cases the destruction of a toe may last over a period of years. Morphin and the coal tar products, inasmuch as they slow down the circulation, fail to relieve the pain.

Any interference for ingrown toe-nails, corns, etc., should be avoided, for it is often the starting point for the gangrene. Arch supports, or anything which produces constriction, only aggravate the condition by cutting down an already impaired circulation.

Much has been done to ascertain the cause of the disease, but as yet practically nothing is known. Most surgeons believe in early high amputations, but we find in this institution that the process can be arrested and the patient rendered free from symptoms by treatment with white light, a substitute for sunlight, over a prolonged period of time. We have used Ringer's solution, thyroid in small doses and many other drugs and have discontinued them after a proper trial. Now we use nitroglycerin, 1 per cent solution in one drop doses internally before meals, for dilatation of the vessels, and tincture echinacea, xxv gtts. after meals, as an antiseptic, and the patients respond to this treatment. We are devoting a large number of beds in this hospital to the treatment of this disease, in the hope that we may discover the cause and cure. By our present method about 65 per cent of the cases are saved from amputation.

Conclusions.

A foot may be regarded as normal only when, in action, it moves through the normal range of motions in relation to the leg. Proper shoes are essential for feet to perform their normal function. In treating painful feet we must ascertain whether we are dealing with an infection, or with a relaxation of the supporting structures. If compression of the whole foot produces pain, it is most likely of the infectious type.

Many of the leading orthopedic surgeons have condemned the promiscuous use of foot-plates, and in the army they were not permitted. In those cases of painful feet which require some form of support under the arch, this can best be accomplished by using some yielding, springy substance, such as felt. The foot must have freedom of action in locomotion, not fixation.

Bile Pigments.

These important constituents of the bile, by their presence in the blood stream, give rise to the characteristic color appearance of jaundice. They are derived from hemoglobin and are formed almost entirely in the liver, where the decomposition of hemoglobin occurs. Bile pigments, if injected into a vein, are poisonous; they are not normally absorbed from the bile in the intestine, but are converted into stercobilin and evacuated with the feces.

Blankenhorn has examined a large number of cases due to jaundice and conditions associated with it, and he finds that bile pigments may be present in the blood without jaundice. He represents the cholemia which he determined by colorimetric methods quanitatively in figures ranging from 15 to 375. And when the degree of cholemia reaches the figure 40 then jaundice will appear clinically. He finds that bile pigments may be present in the blood and jaundice result without bile pigments being in the urine. In cases of obstructive jaundice, catarrhal jaundice, secondary anemia, passive congestion of the liver, and pneumonia he has shown the quantitative relation of bilirubin in the blood and urine, and he has made similar determinations for urobilin. He states that the estimation of bile salts in the blood is associated at present with great difficulty.

Cholesterin may be present in bile in amount ranging from 0.5 to 5 per cent., and is excreted by the bowel. It is an important constituent of gall-stones and its solubility in bile salts has been alluded to as an important factor in the prevention of the formation of gall-stones.

Lecithin is a lipoid, and, like cholesterin, is a product of nervous metabolism; it is an important constituent of bile which is not reabsorbed by the bowel, being kept in solution by the bile salts.—(*Lancet.*)

POLYPOID INFERIOR TURBINATES.

HAROLD M. HAYS, M.D., F.A.C.S.
New York.

In former papers I have frequently stated that operative procedures on the inferior turbinate often result in a distressing, dry condition of the nose which gives more trouble than the original condition.

However, wise surgical judgment frequently indicates the necessity of operating on these structures in conjunction with a submucous resection or because a nasal obstruction is caused by them alone. Ordinary hypertrophy is not an indication for operation because the irritation which causes the hypertrophy is usually due to some condition in some other part of the nose or in the accessory sinuses. For example, the constant drippings of mucopus from an infection of the frontal sinus or ethmoid on an inferior turbinate will cause an engorgment of the mucosa and eventually hypertrophy.

The polypoid inferior turbinate is an entity that demands surgical attention and the offending tissue can readily be removed without interference with the normal condition of the nose. The polypoid tissue is succulent and hangs pendulous and nothing but excision will cause it to disappear. Such tissue usually occurs at the anterior or the posterior end of the turbinate. If in the former position there is little trouble in noting it; if in the latter it is often difficult to make it out without using a pharyngoscope or nasopharyngoscope. Rarely the whole turbinate is polypoid and has to be removed. I operated upon such a case a few months ago in which the polypoid turbinate removed was nearly three inches long and three-quarters of an inch in width. A pendulous portion the size of a pigeon's egg hung down in the nasopharynx so that there was complete nasal obstruction.

It is surprising to note how often complete nasal obstruction is caused by a marked deflection of the septum to one side and a polypoid condition of the anterior portion of the inferior turbinate on the other side. No proper relief can be obtained unless both the septum and the turbinate are operated upon. One should only remove as much of the turbinate as is polypoid. This can readily be done by making a small nick with a nasal scissors and then carrying a snare around the part to be removed.

One word of caution is necessary. Children at the age of puberty who suffer from frequent colds show a mucosa over the turbinate which looks polypoid. This is not the case. The pale watery appearance is due to an anemia of the mucosa from too rapid growth at this age and under no circumstances should it be removed. An atrophic condition is bound to result.

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Pneumonia.

On the affected side the movements are diminished, the negative pressure is lessened and gradually becomes positive, but not to such an extent as to cause displacement of the heart and other organs. At first the loss of elasticity of the lung may be greater than that of the chest expansion, so that the intercostal spaces are depressed in inspiration. However, the affected lung may become so large as to abolish the recoil of the chest wall and the lung be marked by the pressure of the ribs.

When the lower lobe only is affected it may become so enlarged as to compress the upper lobe to half its size and depress the diaphragm. The blood is often badly oxygenated, but this is rarely, if ever, a cause of death; while, on the other hand, the greater percentage of carbonic acid in the blood stimulates the respiratory center and keeps up the pump action.—(*B. M. J.*)

The Diagnostic Laboratory

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Brooklyn, N. Y.

Influence of Malaria on Wassermann Reaction.

The Wassermann test conducted by Thomson and Mills according to a recognized standard method did not give a positive reaction in malaria at any stage of the disease. The authors are convinced that if a positive Wassermann reaction is obtained in a case of malaria it is either due to undiagnosed syphilis or to faulty technic.

(Lancet, May, 1919).

Variation of Wassermann Reaction.

Browning and Kennaway found that when the same specimen of syphilis serum is repeatedly examined for complement fixation in the Wassermann test the actual amounts of complement fixed vary greatly on the different occations. The variations are quite irregular, and depend on factors which cannot, so far be rendered constant. This result prevents the attaching of clinical significance to minor variations in positiveness obtained on repeated tests of the same patient's serum—for example, under treatment. The evidence shows that the criterion of positiveness or negativeness of a serum should not be determined by the absolute amount of complement fixed, but the amount of fixation relative to that produced by a known negative serum.

(Lancet, May, 1919).

Standardization of Wassermann Reaction.

Comparative sudies in various methods for the collection and washing of blood and in the preparation of erythrocyte suspensions for this test were made by Kolmer and Brown. With the fresh blood of persons, sheep and oxen, the method of collection by defibrination or in an anticoagulating fluid, had no apparent influence on the red blood corpuscles so far as their suitability for hemolytic antigen in the Wassermann reaction is concerned. Human blood cells secured by breaking up coagulums in saline solution were slightly less resistent to serum hemolysis.

The authors found that small amounts of blood are best collected in an anticoagulating fluid. They advise that fresh blood cells should be used. Ordinary physiologic saline solution proved as suitable for washing cells as Lock's, Ringer's and Locke-gelatine solutions. The numerical concentration of a corpuscle suspension varied according to the duration and speed centrifugalization in the last washing and according to method of measuring the corpuscle mass; best results were secured by measuring the corpuscles in an accurately graduated centrifuge tube after the final washing. It was noted that variation in the numerical concentration of corpuscle suspensions may influence the results of serum hemolysis; for this reason the same hemolytic antigen must be used in the preliminary complement and hemolysin titrations as in the Wassermann tests unless the suspensions are prepared with uniform accuracy. The fresh erythrocytes of different healthy persons and sheep were found quite constant in their resistence to serum hemolysis. The use of suspension of corpuscles from different persons and sheep does not constitute a source of error in the Wassermann test of technical conditions are correct.

Preserved blood may be used in the preparation of hemolytic antigen for the Wassermann test and for the immunization of rabbits, but fresh blood is always

preferable. Preservation with liquor formaldehydi and saccharose solutions was found practicable for periods of two to four weeks; the liquor formaldehydi method is quite simple and to be preferred. Methods for preserving blood and a method for preparing the red corpuscle suspension for a standardized test are described.
(Amer. Jour. Syph., April, 1919).

Antigen in Complement Fixation Test.

Roderick claims that cholesterinized alcohol human heart extract is probably the most sensitive antigen used in the complement fixation test for syphilis. In a small number of tests, its use results in a slight degree (10 per cent. or less) of inhibition, in cases not syphilitic. This antihemolytic tendency can be overcome by proper titration of complement. Roderick advises that cholesterinized human heart antigen should never be used alone, but controlled by an antigen less sensitive. It is especially valuable in the control of treatment, remaining positive for a considerable length of time after all other antigens are negative.
(Amer. Jour. Syph., April, 1919).

"Provocative" Wassermann Test.

In a series of about 150 cases of treated syphilis of all kinds, Pollitzer and Spiegel did not find a single clear case of a provoked reaction; while the assumption of a cure in all these cases was obviously untenable. In a series of cases temporarily negative, selected as probably not cured, the "provocative" test failed to indicate the presence of syphilis though the subsequent course of the cases proved that the syphilis was not cured. Therefore, Pollitzer and Spiegel regard the "provocative" arsphenamin injection as a useless and often misleading procedure.
(Amer. Jour. Syph., April, 1919).

Intestinal Worms.

Over 35,000 soldiers were examined by Lucke and others; of these 26,672 were white, 8,653 colored. All the white soldiers were residents of Kentucky; 6,948 colored soldiers came from Kentucky, 865 from Alabama, and 840 from Tennessee. Practically all were between 18 and 42 years of age and in good physical condition. It is emphasized that these men were soldiers on active service and presumably in good health, therefore, only men showing no appreciable signs of disease were examined. The parasites present were: hookworm (Necator americanus), roundworm (Ascaris lumbricoides), whipworm |Trichuris trichiura), beef tapeworm (Kaeniasagnata), dwarf tapeworm (Hymenolepis nana), Cochin China worm (Strongyloides stercoralis). A marked difference in the frequency of infestation of white and negro soldiers was notably evident. Of the white soldiers 10.40 per cent. were infected; of the colored soldiers only 1.1 per cent. were infected. Two or more species of parasites in one person occurred 274 times. These concurrent infestations were only present among the whites.
(Military Surgeon, June, 1919).

Treatment of Eczema by Rectal Saline Injections.

Spurgin reports a case of eczema in which a rectal soline enema containing 1 ounce of whiskey was given every other day after clearing the bowel with soap enema. The patient was apparently past all help when this form of treatment was commenced, and the really extraordinary change which took place in a few days, Spurgin says, was interesting and gratifying.
(Brit. Med. Jour., May, 1919)

Improved Method for Estimation of Sugar in Urine and Blood.

Cammidge advises that when a urine is expected to contain a low percentage of sugar, under 0.5 per cent., and with all blood and other fluids containing smaller amounts, the water to which the iodin solution is to be added should be boiled thoroughly to expel dissolved air and cooled immediately before the estimation is to be made. It is also advisable that the alkaline copper solution for sugar estimations with urine should be boiled in a small conical flask provided with a loose funnel as a stopper instead of in a beaker, and that the required amount of urine should be run into the boiling fluid from a pipet when the air dissolved in the solution and contained in the flask has been expelled. With blood, etc., the 7.5 c. c. of filtrate and 1 c. c. of sodium carbonate solution are boiled together in a similar way in a small conical flask fitted with a funnel-stopper, and the 1 c. c of modified Benedict solution is added after they have boiled for a few seconds. The water used for diluting the iodin solution and for washing out the flask, etc., should have been recently boiled and cooled. With these additional precautions the method gives uniformly reliable figures, even with the small amount of sugar in normal urine and blood.
(Lancet, May, 1919).

Test for Activity of Gastric Juice.

Loeper and Binet affirm that the hemolytic action of the gastric juice is a simple and practical means for estimating its potency. The rapidity and the intensity of the hemolysis are a reliable gage of the chemical activity of the gastric juice. They remove the plasma from 10 drops of human blood by rinsing three times physiologic saline and centrifuging three times. Then they distribute the blood in test tubes containing dilutions of gastric juice from 1:4 to 1:10, in the proportion of 2 drops to 2 c. c, and incubate at 37C. Normal juice, titrating 1 gm. HCI, hemolyzes the 1:4 dilution in fifteen minutes; a hyperactive juice in three minutes; an inactive juice not even in forty-five minutes. The hemolysis occurs the same whatever the source of the human blood corpuscles. The hydrochloric acid is evidently the main but not the sole factor involved. There was no evidence of hemolysis with this test in their cancer cases, but the hemolytic response was extremely intense with hyperchlorhydria and with gastric ulcer.
(Presse Medicale, Paris, May, 1919).

Serotherapy of Erysipelas.

Basset published last year the fine results he had obtained in various acute local infections, lymphangitis, anthrax, phlegmons, etc., from subcutaneous injections of a polyvalent antiserum (Leclainche and Vallee). He has since applied this treatment in sixteen cases of erysipelas and found it particularly rapid and effectual in its action in this disease, supplemented by local measures. The dose was from 20 to 40 c. c of the antiserum, and the fever and the patch subsided in from two to six days. Painting with iodin twice a day seemed the simplest and most active of the local measures tried.
(Presse Medicale, Paris, May, 1919).

Complement Fixation in Influenza.

The outstanding feature of the work done by Howell and Anderson on complement fixation with influenza serum is the large number of positive results with certain strains of the viridans group of streptococci isolated from cases of influenza at Camp Meade and in Chicago. The evidence indicates that such organisms

probably played an important part in the morbid process even in other places.

(Journal of Infectious Diseases, July, 1919).

Bacteriology of Influenza.

The report is based on a study of cases admitted to hospital with a diagnosis of influenza or pneumonia. Direct smears and cultures from 150 cases were studied by Dick and Murray. Influenza bacilli were found in eighty-seven (63.2 per cent.) of 138 cases in which specimens of sputum or nasopharyngeal secretion were obtained. In the direct smear of the sputum, the influenza bacilli were of varied morphology, appearing in most cases as minute, gram-negative bacilli with rounded ends, usually short, sometimes in pairs like pneumococcus, but much smaller. In some smears they were so small as to be overlooked easily. In other specimens they appeared as short threads. In sputum which gave a pure culture, they were astonishingly numerous, some being within the leukocytes. Not much difficulty was found in growing the influenza bacillus in pure culture. Pneumococci of all four types were found in thirty-five (25.4 per cent.) of 138 cases in which sputum or nasopharyngeal secretion was obtained. The leukocyte count in the cases of pure influenza bacillus inftction was low, corresponding to the leukopenia regarded as characteristic of epidemic influenza.

In another article Jordan made daily examinations of a number of selected typical cases, mild and severe, have shown no one organism constantly demonstrable in large numbers by the methods employed. The two organisms most commonly and abundantly present in this series were the Pfeiffer bacillus and the diplococcus or streptococcus found by Mathers at Camp Meade. The Pfeiffer bacillus was found in 64 per cent. of the cases. The Mathers coccus was found about as frequently and abundantly as the Pfeiffer bacillus, although its occurence was quite independent of that of the latter. The pneumococcus was found in about 20 per cent. of the cases. M. catarrhalis, the Friedlander bacillus and an unidentified gram-negative diplococcus were found at times in large numbers in the throat, nose and nasopharynx of influenza cases. Staphylococci were also sometimes present in great abundance. Two observations on suspected cases of "recurrence" or "second attack" have shown the presence in the throat of organisms (hemolytic streptococci) not found during the original attack. Both recurrences presented some of the clinical symptoms of influenza, but had a moderate leukocytosis. A third case of suspected "recurrence" likewise showed hemolytic streptococci in the throat and slight leukocytosis, but this patient had not been under observation during the primary attack.

It seems probable to Jordan that an alleged "second attack" of influenza occuring within a few weeks of the original attack is at least in some cases a new infection with another organism. The observations carried out by the aerobic blood agar plate method and recorded in this paper have not shown the predominance of constant presence of any one organism in the proper respiratory tract of influenza patients. The Pfeiffer bacillus, however, has been more conspicuous than any other organism, particularly in comparison with its relative infrequency in cases of rhinitis and tonsillitis examined during the same epidemic period.

(Journal of Infectious Diseases, July, 1919).

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Surgery

Repair of the Male Urethra.

E. D. Telford and F. G. Norbury relate this case: The patient, a strongly built man aged 37, was seized in April, 1917, with a sudden extravasation of urine due to a stricture of old standing. Very extensive incisions were made into the scrotum and lower abdominal wall with perineal drainage of the bladder. Much sloughing ensued, especially about the perineum, but he eventually made a good recovery, the whole of his urine passing by the perineal opening.

On Nov. 14th, 1917, he was admitted to the Manchester Royal Infirmary. Examination showed a small fistulous opening through which the whole of the urine was discharged. This opening was placed immediately in front of the anus and was embedded in much scar tissue.

On Nov. 26th the patient was anesthetised and placed in the lithotomy position. A median incision 2½ inches long was made, so placed that it embraced the fistulous opening at the hinder end of the incision. Much scar tissue was encountered, but by the aid of a Wheelhouse staff the proximal end of the distal portion of the urethra was identified. This was dug out of scar tissue and freshened by a cross section. The distal end of the proximal segment was then sought. It was found easily, but was difficult to define owing to its being almost flush with the triangular ligament. With both ends thus freed, it was seen that there was no possibility of direct end-to-end union, the gap being 1¼ inches in extent.

In order to obtain material to fill in the gap a circumcision was done on a year-old infant with a very long prepuce. This was done by the old forceps method. The portion of skin so obtained was divided vertically and by separating and reflecting the small strip of lining mucosa some increase of the size of the graft was obtained. The graft thus made was rectangular, and consisted for three-quarters of its area of skin and for one-quarter of mucous membrane.

The next stage of the operation was to convert this graft into a tube fixed to the divided ends of the urethra. The graft was first stitched by three sutures to the cut edge of both ends of the urethra on the dorsal surface of the canal. A large silver catheter was then passed and the graft was fixed by sutures at both ends to the cut edges of the urethra on its ventral aspect. A continuous suture, inserted parallel to the catheter, converted the graft into a tube, having skin and mucosa for its inner lining. The sutures were of a lightly chromicised catgut. The soft parts were then united over the graft with some difficulty owing to the scar tissue and the covering layer consisted of little more than skin, which was brought together without drain by sutures of silkworm gut. no further attempt was made to pass an instrument. On the fourteenth day the patient developed a subacute left-sided epididymitis, due no doubt to the long retention of the catheter. This gave little trouble but was slow in subsiding. The wound healed without incident, no urine having leaked at any time since the operation. The patient passed urine freely after removal of the catheter and continued to do so without difficulty and with no undue frequency.

No further instrumentation was done until March 9, 1918, 15 weeks after the operation, when sounds were employed to investigate the condition of the urethra. A 9/12 sound was passed without any difficulty. On his discharge from hospital at the end of March a sound passed without any evidence of narrowing of the grafted segment, and three months later a 9/12 sound passed readily.—(*Lancet*, Feb. 1, 1919.)

Surgical Treatment in Malignant Tumors of the Jaws.

C. H. Frazier reviews this subject. Ochsner has treated 100 cases since 1906, of which 67 per cent were cancer, 16 per cent sarcoma and 16 per cent were epulis. Forty-seven cases originated from the lower jaw, 25 from the upper and 6 from the antrum in the cancer and epulis group. Of the sarcoma, 8 originated in the upper jaw and 4 in the lower jaw. Ochsner had a mortality of 20 per cent in his hospital. He anesthetized his patient with ether and operated in a semi-sitting position. In cancer cases he prefers the cauterizing iron to remove the malignant growth and cauterizes deeply and widely, but prefers excision of the jaw in sarcoma.

Another advocate of the use of heat, and also of radium in the treatment of cancer of the jaw and cheek, is New, who reports a series of 57 cases from the Mayo Clinic. From these, 21 were selected without glandular involvement, and retreated in the following manner:

"After the patient is anesthetized with ether a mouth-gag is inserted opposite the affected side. The tongue is drawn to one side out of the way, by the aid of a stomach clicker. The water-cooled speculum is inserted, an all the teeth in the area involved, or those that prevent good exposure of the growth are removed. If it is possible, the entire growth is excised from the jaw or cheek with a knife cautery, and the base is cauterized with soldering irons. If this is not possible, the irons are inserted into the tumor. The water-cooled sepculum prevents the burning of the lips or cheecks except in the area being treated, and it affords good exposure. A wooden tongue depressor holds the tongue out of the way and prevents it from being burned. The cautery should be used longer than seems really necessary—at least for from twenty to forty-five minutes. If the growth is in the upper jaw and involves the antrum, the soldering irons are carried up into the antrum and the entire growth is gradually burned away.

Soldering irons are found to be the most satisfactory type of cautery, as the heating element in the handle of the electric cautery usually interferes with a good view of the area that is being treated. If the irons are too hot, the surface cauterized becomes carbonized and prevents the penetration of the heat. A slow heat that gradually cooks the tumor is preferable.

Occasionally hemorrhage will occur during the first ten days or two weeks following the cauterization while the slough is clearing off, and, if it is not readily controlled by packing, ligation of the external carotid with the lingual and faical branches is advisable.

About two weeks after the cauterization, most of the slough will have cleared off, and radium may be applied directly into this open area. It is directed into the ulcerating area on lead applicators, using a 50 or 100 mg. tube within a silver tube, for from fifteen to twenty hours, without screening. If the growth has involved the cheek, radium is applied with screening externally over the cheek, thus cross-firing. If the growth has involved the antrum, the raidum is placed in the antrum, packed there with petrolatum gauze, and left in place for the period of hours required by the particular type of lesion.

In from a month to six weeks after the operation, large pieces of sequestrum usually come away from the jaw. These pieces are sometimes one-fourteenth to three-eighths inch thick. In a month from the time the first radium treatment is completed, further treatment is given and repeated as often as the condition indicates. If there is any recurrence noted a second cauterization is done, and this is followed by radium.

Epithelioma of the jaw does not, as a rule, metastasize early, unless there is considerable involvement of the cheek. In such a case, the submental and submaxillary glands on the affected side should be removed."

Of the 21 patients so treated, 20 were traced, and, of these, 14 were found to be free of local occurrence for from six to eight months; two of them, however, have developed glans of the neck, and have had block sections. There was no operative mortality.

It has been my custom for some time to treat cancers of the oral cavity by means of the cautery instead of using the knife. Recently, however, I have been better pleased with the results obtained from the distribution of the local lesion by electrocoagulation. The destruction seems just as complete and the resulting scar smoother and accompanied by less contraction. Clarke reports an analysis of 200 cases treated by electrothermic methods. Contrary to the opinion of Janeway, expressed above, he states that he has never seen any benefit result from the use of the *x*-ray or radium alone in the treatment of cancer with in the oral cavity. Clarke further remarks that:

"Before large growths at the base of the tongue, epiglottis, larynx or esophagus are treated, a tracheotomy should be done first and the larynx packed from below, to prevent aspiration of toxic or other secretions. The ligation of the external carotid, and in rare instances the common carotid, may be practised as preliminary to the treatment of some growths of the throat. Hemiplegia may occur, however, in the latter instance."

Deep, cross-fire roentgen therapy, according to standard technic, should be applied to the neck after dissection of the cervical glands, with the hope of preventing recurrence. When the glands are not involved, the roentgen ray should also be applied to them after electrothermic treatment of the primary lesion. The roentgen ray is of more value in the latter instance than in the former, as its use often prevents involvement of the glands, and when they are involved the roentgen ray will often retard the progress of the disease. Deep, cross-fire roentgen therapy may be used following electrothermic destruction at the site of the primary lesion to reach possible outlying cancer cells, as may radium, especially within the mouth; but the same area should never be treated by both the roentgen ray and radium. He has never seen any benefit result, however, from the use of the roentgen ray or radium alone in the treatment of cancer within the oral cavity, but the roentgen rays are undoubted value as an adjunct to electrothermic methods and surgery."

Pfahler is also an advocate of electrocoagulation as an adjunct to roentgenotherapy. It is his custom, "in nearly all instances, to destroy superficial malignant disease by electrocoagulation before applying the roentgen rays. This applies to all the epitheliomata of the skin, both the basal cell and squamous cell; all the epitheliomata of the lip and the mucous membrane of the mouth; epitheliomata of the vulva and of the penis." He is sure that he gets more patients well, and better and quicker results in this group of patients, than by any other means or any other combination. After the disease is destroyed and the dead tissue curetted away, the area is treated by deep roentgenotherapy, and in mouth cases or mucous membrane cases the glandular areas in the neighborhood are thoroughly treated. This roentgen-ray treatment is repeated again in four weeks, and after that as many times as seems necessary, according to the degree of malignancy, the location and the extent of the disease.

He advocates surgery in deep-seated tumors, such as in cancer of the breast, and believes that metastatic glands should be removed surgically, because while has has seen enlarged glands disappear under *x*-ray treatment, he has been particularly disappointed in the group of cases in which the enlargement has been secondary to cancer of the mouth.

Treatment of Bone Sinuses by Solid Metal Drains.

Charters J. Symonds, Colonel, A. M. S.; Consulting Surgeon, H. M. Forces (Southern Command); Consulting Surgeon, Guy's Hospital, says that for over 25 years he has employed both hollow and solid metal drains, and of late has used them in these troublesome sequelæ of fractures and gunshot injuries. The great value of the method deserves to be widely known.

In a paper read before the Medical Society of London he described the satisfactory drainage obtained by solid drains, and full particulars were given. The metal prevents closure of the orifice, which neither a rubber tube nor gauze packing will do. It also rapidly reduces the septic changes, and by preventing retention of pus, with consequent decomposition and infective osteitis permits the formation of new material and closure of the cavity. Rubber and gauze both cause irritation, and the latter always some bleeding, which increases septic changes.

The rod is smooth, has a rounded end, and can be removed and inserted without any injury. When substituted for gauze the beneficial effects are at once evident in the disappearance of the surrounding dermatitis and marginal granulations (both due to infection) and the decrease in the discharge. Pain, where existing, rapidly subsides and very soon a retraction of the orifice is seen. The patient can go about with a tube *in situ;* indeed, one of his early cases wore a tube in the lower end of the tibia and drove a motor bus in London. Aluminium answers well and rods can be formed out of splinting material. Of late he has used glass rod, bent to any desired angle.

Such rods have been used frequently to drain cavities, the result of gunshot injuries, in the tibia, femur, os calcis, and tarsus generally, and also in the carpus. Most striking is the diminution of the discharge, so that the foot and hand can be put up in plaster-of-Paris at once.

To illustrate by one case, an officer came from the first battle of Ypres with a large ragged wound through the carpus, with much swelling of the hand. For three weeks he was treated with baths and a splint. Then, for the first time, the wound was gently curetted so as to remove loose fragments only. A rod of aluminium was passed through and the hand and arm put up in plaster-of-Paris. At once pain disappeared, the dressings were reduced in frequency, andthe general condition improved. The rod was left untouched for a month and then reduced in size. The combination secured a rapid recovery.—(*Lancet*, June 7, 1919.)

Pneumothorax.

When the air enters the pleural cavity from the lung the exit is usually not so free as the inlet, so the intrapleural tension, both in inspiration and expiration, becomes positive; then the lung collapses, and does not get a chance of expanding again unless the perforation heals and the air becomes absorbed. In these cases, if there be much respiratory distress, part of the air should be withdrawn.

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Disease the Democratizer.

It would sometimes appear that disease is the greatest force of all in making men alike, and alikeness, we take it, is the chief consequence and aim of democracy; it is, indeed, the character by which we identify democracy.

Democracy reacts in an unfriendly manner to those who have not the sacred earmarks and wages actual wars upon them. To be accepted you must possess both visible and invisible trademarks. You must wear your hair and your social standards in a certain way. Your clothes and your mind must conform.

Now our diseases tend to make us alike, and to the extent that they do this they are democratizers. The women who have had abdominal operations constitute a kind of guild; they have much in common; a woman who has not had a section is a kind of pariah.

Those who have had tuberculosis are as the members of a Blue Lodge, and they wear in their chests the calcified and caseous badges that proclaim them brothers.

A minor order is made up of those who have Riggs' disease. By their recessed and sacculated gums they may be known, for these are their insignia.

You cannot hold aloof from these fraternities; you must submit to democratization by eczema, and become like the great group who wear the heraldry of this disease on their skins, or you must accept a certificate from the great organization whose democracy has been effected by influenza.

Spiritual kinship is at once set up between one who has succumbed to cancer and the whole host of sufferers from that dread malady. Standing out before all else is the great fact of carcinomatous communism. The chauffeur becomes kin of the plutocrat; the scrubwoman of the marchioness. No "red" upheaval can make such folks so much alike as malignancy.

What other force is equally potent in effecting democracy? What comradeship is like that of a maimed soldiery? What is so leveling as syphilis? What makes a king so indistinguishable from a peasant as typhus fever? Before Jenner's time pockmarks did far more than we have ever suspected to bring about British democracy; the unpockmarked man was an exception, and thereby set apart from the people.

The very concept of democracy must have been born in part in the sphere of epidemics. The example of acute infectious disease like the plague runhing through a community and making of all the populace bubonic horrors, must have suggested political revolution and the transmogrification of prince and pauper.

Disease has leveled and communized us; but for disease democracy would not have gained its present prestige.

Perhaps this tendency of disease is not the least of its objectionable features!

The Human Microcosm.

Static conceptions of disease are passing away. The dynamics of pathology in the operating room and clinic are not the same thing as mortuary findings. Nevertheless we have far to go along this line before we come to rational viewpoints in many disorders of the body and mind.

We have been in the habit of regarding certain disabilities as fixed in character which may really be subject to marked variations, depending upon the immediate potency or paralysis of inhibitions. May it not be possible that even such conditions as feeblemindedness may represent at times merely the negative phase of an individual's mental range? Would not such an hypothesis account for the fluctuations observed in certain subjects within short periods, and would it not account for the transitions observed after long periods, as in "inspired idiots" like Oliver Goldsmith? Some of those whom we call fools are not necessarily fools all the time.

Then again, are there not many individuals of accredited intellectuality who at times present the most egregious departures from their standard phase? Do not our estimates of personalities and personages hold good, after all, for particular occasions only? A Lloyd George may be found either dull and uninspiring or marvellously endowed; he may be a radical today and a reactionary tomorrow. A Conan Doyle may typify the man of science, and then again he may appear as credulous of spirits. In the case of Lincoln we have St. Gaudens' conception—and Barnard's—the one a spiritualized projection, the other a perfect clinical study of acromegaly.

The human being is a composite, after all, and the standardization of types is futile. Even a feebleminded Caliban may have streaks of Prospero in him, and a Napoleon can believe in signs and portents in the skies and pin his faith to clairvoyants. A German Kaiser can be anything you like, depending upon whether you are a Prussian peasant or the mother of a soldier of democracy dead in Flanders. The son of George and Mary dead in Windsor Castle may have been a sorry epileptic in the eyes of his physicians, and a lovable figure to his parents. To the London crowd Francis Thompson was a worthless vagabond, but the world of intel-

lect knows him as one of the greatest achievements of the nineteenth century.

Who shall assess mathematically the real value of any human being? Who shall assign to him a fixed status? Who shall assess the assessor? Above all, who dares to posit the "normal," that most shifting and unstable of abstractions?

In the vagaries of your friend behold multiple personalities—the fool, the philosopher, the knave, the hero, the craven, aye, and the Christ.

Hospital Dentistry

The relation of the septic mouth and dental defects to gastric and duodenal ulcers and to a wide range of other affections of the digestive tract is certainly obvious, but we have been unable to satisfy ourselves that in the management of these cases in our hospitals thoroughgoing correction of buccal pathology is the rule, along with the painstaking care that is given to all other details of medical and surgical treatment.

What is the sense of all our exhaustive care if the mouth is not cleaned up and proper masticatory powers restored?

Does not this neglect go far toward explaining some of the unsatisfactory recurrences?

How much have petty staff jealousies to do with this matter—jealousies having to do with the dental surgeons on the staffs or with the failure to appoint such surgeons?

Or is the deplorable situation mainly an economic one?

Group Mental Age.

The results of the psychological examination of soldiers have borne out our contention in the past that many things in life become clear when considered in relation to the mental age of great groups playing parts in our complex civilization.

Professor Barnes, of Philadelphia, has pointed out that the soldiers were selected men, and that the intelligence of the civil population at large must be considerably lower than was theirs'. Since the composite mental age of the soldiers was thirteen, it devolves upon us to rate the populace pretty low.

The bearing of these facts upon lynching, prohibition, etc., seems patent enough. The ease with which any kind of propaganda is put over is another significant thing; from abject terror of a political system which fits another country and could by no possibility be fitted to ours, to the confusion of capitalism with Americanism, we see the ludicrous results of propagandism.

The vogue of the movies is another earnest of the public's mental status. The revelations of puerile and asinine concepts in the minds of various official investigators of movements and social trends, and in the brains of professional chauvinists economically linked with the vested interests, also help hugely in establishing our thesis.

The sexual immaturity and primitiveness of the average man, and his general simpleness, bespeak mental defectiveness. The proofs multiply themselves blatently; to cite them would be a needless indiscretion.

The speech to Congress upon the return from Europe was not flattering to the intelligence of that body. The Speaker in question has no misconceptions about his audiences, and since the farce at Washington has been multiplying evidence for us throughout the length and breadth of the land.

That which would be received with levity by intelligent persons evokes solemn reception, not because of a lack of humor, but because of stupidity.

The discovery of the "utility" of propaganda of the sort now heavily financed and intensively carried on everywhere ranks with the invention and application of poison gas. Just as the inventors of the latter determined the vital susceptibilities of human beings, so the discoverers of propaganda determined scientifically the mental suceptibilities of their victims. The vast masses of immature and uncultured people are easily asphyxiated by propaganda in the interest of any elected cause whatever. This is especially well understood and applied by the press.

Naturally, counter-propaganda takes the field, as in the case of health insurance.

Intelligent persons reach their conclusions unperturbed by these wastes of energy, just as they form their religious concepts without the aid of revivals.

We insist that the problem of feeble-mindedness is not a circumscribed one; it is a vast and appalling morbidity. The rise and fall of governments and social phenomena in general hang upon it. In it are the roots of war.

There is nothing to be done; it is simply a spectacle to be viewed fearfully or amusedly, according to one's temperament.

Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

Tonal Art Therapy.

"Music hath charms to soothe the savage breast," and its undoubted value in the treatment of nervous and mental patients and convalescents is a further earnest of its potent physiologic influence.

Perhaps it could be utilized in the treatment of vascular hypotension and hypertension. It may have been so used, but we shall venture to discuss the possibilities anyway.

It has been suggested that women have been specially devoted to music (addicted?) because it gives them what the men have sought through alcohol. The emotional intoxication frequently observed at concerts seems significant. Berlioz speaks of certain pieces doubling his vital forces and causing violent pulsation of his arteries.

Experiments should be made—if they have not already been made—upon normal persons to determine the vascular effects of music. Then we should, perhaps, be in a position to prescribe it scientifically—nocturnes for aortic disease, symphonies for coronary lesions Sousa marches and the Star Spangled Banner for hypotension!

A fig for high frequency currents and drugs! Wind up the phonograph and put on some jazz.

Inspirational Dyspepsia.

De Casseres proclaims a stomachic theory of genius. He thinks it is highly probable that if Beethoven had not eaten a certain amount of sauerkraut and pork at a fateful hour on a marked day he would never have been inspired to compose the Ninth Symphony. *King Lear*, he says, first resided in a huge piece of roast beef which Shakespeare ordered with a scuttle of ale. Emerson's great apothegms pre-existed whole and undivided in the Boston baked bean before it became cerebral thunder, then printer's ink, and pie may have been the source of the essay on Compensation. *Ulalume*

flashed upon Poe after he had dined upon a bagful of peanuts. Balzac could not work upon his *Comédié Humaine* until he had eaten hot Murpheys and drunk black coffee. "Be it ever so humble, the stomach is father to the man."

Perhaps war bread and some of the other near-food of recent times, like the pastry they are making with petroleum, deserve a place in this discussion. The chap who wrote the German *Song of Hate* probably fed up on flatulent substitutes before spewing his literary atrocity.

Referred to the Casuists.

Of the total of about two million men who were examined during the war under the auspices of the Committee on the Psychological Examination of Recruits 3 per cent. were rated below the mental age of ten years. The composite age of the men was about 13.

Reactionary employers of children in industry might be imagined basing an argument upon these statistics going to show that child labor is just as justifiable as the employment of "children of a larger growth" to fight the battles of the country.

Diagnosis and Treatment

Serum Treatment of Meningococcic Meningitis.

Sir Humphry Rolleston says the treatment of meningococcic meningitis by intrathecal injections of antimeningococcic serum, which exerts a bacteriológical action on the meningococci, favors their phagocytosis, and contains an anti-endotoxin, was introduced by Flexner and Jobling in 1907 on the grounds that the antiserum is thus brought into direct contact with the focus of infection and inflammation, and that the passage of colloids from the blood stream into the cerebro-spinal fluid is a slow and imperfect process in health, and probably also in inflamed states of the membranes. In 1917 Flexner restated the position and pointed out that, as very little serum from the blood reaches the inflamed meninges, it is useless to inject it subcutaneously or intravenously in the expectation that it will exert any influence on meningococci in the subarachnoid space. In the same year, however, in conjunction with Amoss, he showed that in acute poliomyelitis the immune bodies, though they do not pass through healthy choroid plexus from the blood to the cerebro-spinal fluid, are able to traverse them when inflamed; if this hold good as regards meningococcic meningitis, his earlier argument is partially weakened; but this is only of academic interest, for the success of intrathecal injection of serum in meningococcic meningitis has been proved beyond all question, and this method has superseded the easier one of hypodermic or intramuscular injection.

Doubtful cases should be submitted to lumbar puncture at once; if the fluid be turbid serum should be given; but if it be quite clear serum should be withheld unless meningococci be subsequently found, as the aseptic meningitis set up by serum may facilitate the passage of meningococci from the blood into the subarachnoid space. If the cerebro-spinal fluid be sterile, and especially when a blood culture shows meningococci, intravenous injections of serum should be given without delay; and, as the septicæmic stage of cerebro-spinal fever lasts on into the meningitic stage, the intravenous injections should be continued for a time, together with intrathecal injections.

Lumbar puncture and the injection of serum should be performed under a general anæsthetic or under the influence of an injection of scopolamin 1/100 gr., morphin 1/6 gr., and atropin 1/100 gr. in 5 minims of water. The serum should be run in slowly and in a quantity smaller than that of the cerebro-spinal fluid removed; 20 to 30 c. cm. of serum should be given twice daily for some three or four days, for by this intensive treatment the best results are obtained. The continuance or omission of the injections is decided on the state of the cerebro-spinal fluid, the patient's general condition, and the temperature. With the new Medical Research Committee's serum the pooled serum corresponding to type I. and II. is given until the type of the infecting meningococcus is established, and then the corresponding monotype serum is substituted. The access of serum to the base of the brain is facilitated by raising the foot of the bed, and Ramond recommends that the patient should lie for a time on his face in order to direct the serum to the region of the optic chiasma.

When any recrudescence or relapse appears serum treatment must be at once started again; when an interval of 10 days or more from the last injection of serum has elapsed steps must be taken to desensitize the patient, otherwise severe anaphylactic symptoms may appear; a very small (0.5-1 c. cm.) hypodermic injection of serum may be given 4 hours before the curative dose of serum is given intrathecally, or Besredka's method of rapidly repeated intravenous injections of minute but progressively increasing amounts of serum may be employed, which though elaborate obviates the delay necessitated by the simpler hypodermic method. Before the curative dose is given, 1/75 gr. of atropin should be injected hypodermically. An anæsthetic prevents the occurrence of anaphylactic symptoms.

In order to prevent the accumulation of pus and fibrin in the subarachnoid space and the subsequent formation of adhesions, irrigation with saline solution is often practised, and an isotonic solution of sodium citrate (3-8 per cent) has been recommended for this purpose by Rosenthal. J. J. O'Malley contrasts the results of simple lumbar puncture and administration of serum among 36 patients with a mortality of 33 per cent with those of the same procedure with the addition of saline irrigation among 15 cases with a mortality of 13 per cent. Sheffield Neave has washed out the intrathecal space with saline solution containing 0.5 per cent carbolic acid with beneficial results. In this connection attention should be drawn to Flexner and Amoss's results showing that lysol and protargol fail to benefit experimental meningococcic meningitis and exert an adverse influence by diminishing leucocytic emigration and phagocytosis.

The number of intrathecal injections of serum should be carefully considered, for it is probable that harm may result from a large number of lumbar punctures. Thus the cerebro-spinal fluid continues to collect, and as a result of repeated withdrawals an excessive secretion of cerebro-spinal fluid, perhaps comparable to cerebro-spinal rhinorrhea, may be induced. Some prolonged cases, probably those with adhesions, appear to become resistant to serum, and sometimes intrathecal injections are followed by aggravation of the symptoms, such as headache and opisthotonos. Herrick, who considers that signs of chronic or subacute caudal myelitis are common in convalescents as a result of injury from the needle, or the injury of serum, advises that if a satisfactory response does not occur after eight or ten intrathecal injections the injection should be discontinued and simple lumbar puncture performed only when signs of increased pressure demand it.

Grave symptoms and even sudden death during intrathecal injections have been ascribed to various factors, such as anaphylaxis, liberation of toxins by rapid lysis of meningococci, the toxic action of phenol often employed to preserve the serum, and, most important of all, increased intracranial pressure and distension of the closed cerebral ventricles. To avoid this a smaller quantity of serum than that of the cerebro-spinal fluid removed is important, and the gravity method of administering intrathecal injections has been advocated and practised, especially in America.

The blood pressure was found by Sophian to be lowered by lumbar puncture, and still further depressed by intrathecal injection of serum; he therefore employed blood-pressure observations as a guide to the amount of serum injected. Fairley and Stewart, however, found that the effect of lumbar puncture on blood pressure was variable, a rise being almost as common as a fall, and an initial higher pressure being followed by a fall and vice versa; but they agreed with Sophian in finding that a fall of blood pressure was commoner than a rise after intrathecal injection of serum. MacLagan has never seen a dangerous fall of blood pressure from the gradual intrathecal injection of serum, and few authors appear to have thought it necessary to control the administration of serum by blood-pressure estimations.

Roskam argues that an important factor in causing collapse, respiratory failure, and coma, after the intrathecal injection of antimeningococcic serum in quantities larger than that of the cerebro-spinal fluid removed is the presence of adhesions or lymph blocking the passage of fluid from the subarachnoid spaces into the ventricles. If these apertures be blocked, increased intrachanial pressure is brought to bear on the brain and medulla. On the other hand, when the apertures remain patent the fluid passes into the ventricles and there is no in-

creased pressure exerted. Whenever acute symptoms occur after intrathecal injection of serum the fluid should be allowed to run out of the theca, and hypodermic injection of atropin should be given, and if necessary, artificial respiration carried out.

Intrathecal injections of serum in rare instances are followed by secondary infections through the puncture wound, especially after a large number of lumbar punctures, with a rapidly fatal issue. Secondary infection may also occur through the blood-stream, and Netter and Salanier considered that this may be favored by the injection of large quantities of serum, especially if it be not the type serum.—(*Lancet, No.* 4990, 1919.)

Recent Advances in the Treatment of Pneumonia.

In view of the enormous increase in the death-rate from pneumonia in the last few months the memorandum on this disease recently published by the Local Government Board, London, dealing, as it does, with prophylaxis and general administrative measures, deserves to be widely circulated. In this connection special interest attaches to the publication of Volume XXIX. of Studies from the Rockefeller Institute for Medical Research. During recent years there has been in progress in the Hospital of the Rockefeller Institute a study of acute lobar pneumonia, with the special object of improving methods of treatment. The paper contributed by Avery, Chickering, Cole and Duchez, dealing more especially with the prevention and serum treatment of the disease, marks a distinct advance in our knowledge of this acute disorder. Attention has been confined to pneumonia of the lobar type, due to Diplococcus pneumonia, though certain of the results obtained are undoubtedly applicable to lobular infections of the lung and to other pneumo-coccus infections as well.

The authors' researches lead them to the conclusion that as in the case of the meningococcus, various strains of the pneumo-coccus can be differentiated by the use of specific serums. Instead of regarding lobar pneumonia as one disease, they consider it a group of diseases. Although at present they fail to distinguish any constant clinical or pathological differences among the cases due to the different types of the pneumococcus, certain observations suggest that a clinical differentiation even of these cases may not be entirely impossible. Such a separation of the cases of pneumonia is analogous to what we have become accustomed to in the typhoid-paratyphoid group of infections.

Four types of the pneumococcus can be distinguished. Type I. is the most common cause of infection in man, giving rise to about one-third of the total cases in those localities in the United States in which studies of the types of pneumococcus have been made. Type IV. is less potent; organisms of this class are present normally in a large proportion of healthy throats, but many acquire pathogenicity under conditions as yet ill understood. Up to the present time antipneumococcic serum has been demonstrated to be effective only in cases due to Type I. pneumococcus. The serums of Type II. and Type III. are much less efficacious. The serums of the respective types also show a high degree of specificity, so that a Type I. serum is hardly more effective against infection due to Type II. pneumococci than antidiphtheritic serum would be. For this reason the authors do not advise the routine manufacture of polyvalent antipneumococcic serum. In practice it is recommended that immediately a patient comes under the care of a physician the type of pneumococcus responsible for the infection be determined, and if it prove to be of Type I. serum treatment should be undertaken at once.

An exception is to be made in the case of very young children who, as a rule, appear but little intoxicated by the infection and in whom the prognosis is good and the difficulty of this line of treatment great. Every patient must also receive proper tests to determine whether he is highly sensitive to horse serum, and should this be the case measures for the desensitization of the patient must be employed. This tedious process was only found necessary on two or three occasions in a series of over 150 cases. The seurm is then introduced slowly into a vein, the quantity which is given as an intial dose is about 100 c.cm. Once specific treatment is started it is to be continued until a definitely favorable result is obtained, and in order to accomplish this, the serum has to be given every 8 hours in doses of 90 or 100 c.cm., unless there are indications to the contrary. The average total amount of serum required has been about 250 c.cm. in the authors' experience. In the cases in which no reaction is obtained after several doses of serum, great care must be exercised to detect the presence of complications, such as empyema or otitis media, to which the persistence of temperature may be due, and on the existence of which the failure of the serum depends.

The authors conclude that after the injection of serum not only is ther a definite improvement in the general condition of the patient, but that (1) pulmonary consolidation ceases to extend; (2) invasion of the blood by pneumococci is prevented, or if it has already occured, the blood becomes sterile after one or two doses; and (3) the appearance in the blood stream of immune bodies which normally appear only at or about the time of crisis. Major Nichols, of the United States Army, who treated cases occurring among troops on the Mexican border, reported a mortality of 8 per cent. in cases treated with serum, as opposed to a mortality of 39 per cent. not treated with serum. The findings of these American investigators are of the utmost importance, but confirmation is required before they can be generally applied in this country, for we have evidence that the types of pneumococci differ in different localities; in this connection we have only to instance the experience in South Africa, where the strain responsible for a large proportion of cases of pneumonia in Transvaal natives appears not to be represented in America. To carry the work outlined above into effect will necessitate not only the storing and distribution of large supplies of serum of standard potency available at short notice, but special provision will have to be made in private and hospital laboratories, and in public health laboratories, for carrying out at all hours the technical procedures involved in determining the type of pneumococcus responsible in any individual case.—(*Lancet, No.* 4991, 1919.)

Jaundice in Anemia.

In chlorosis jaundice is almost invariably absent.

In pernicious anemia a waxy lemon-yellow tint of the skin is common, but definite yellow tin affecting both skin and conjunctivæ is rare. Marked jaundice scarcely ever occurs in this disease.

Banti's disease or splenic antemia.—Jaundice is a rare symptom in this disease. In cases where the splenomegaly is accompanied by a progressive cirrhosis of the liver jaundice of a slight type will usually be present.

Acholuric jaundice.—The congenital type of this disease was first described by Minkowski in 1900, and since then numerous cases have been recorded. Its characteristic features are: (1) a family history of the disease; (2) chronic splenomegaly; (3) maintenance of fair health for a long period; (4) chronic slight jaundice; (5) presence of urobilin in the urine but absence of bile pigment; (6) increased tendency to hemolysis of the red blood corpuscles. The blood serum in these cases contains bile pigment. The icterus is not always present at birth, but may develop in childhood.

Acquired acholuric jaundice.—Cases with no family history have been described by many observers. The jaundice and other symptoms have the same characters as the congenital form.

Hereditary icterus.—Dr. John Thomson attributes this disease to a congenital narrowing of the bile-duct coupled with an inflammatory set up by the altered bile. The congenital acholuric jaundice already described comes under this head.

Icterus neonatarum may be (1) physiological, which is fairly common, and is a mild form which soon passes off; (2) severe, and due to (*a*) congenital absence of the common bile-duct; (*b*) congenital syphilitic hepatitis; (*c*) an infective form set up by a septic infection from the umbilicus, or more commonly by an infection of intestinal origin. In icterus neonatorum, unlike other forms of jaundice, the central nervous system often shows bile staining.—(*Lancet.*)

Nevi.

The radium treatment of cavernous nevi may be regarded as most satisfactory, and though the procedure is somewhat lengthy, screened exposures having to be given every six weeks for from six to twelve months or even more, the result is always better than could be obtained by other means. On the other hand, capillary nevi are not so favorably influenced, and although the removal of a small capillary nevus may quickly be brought about by the employment of a destructive reaction of moderate degree, this method is not practicable in large and widely distributed port wine stains by reason of the extensive scarring which would result. Much care and experience are needed for the treatment of these cases. Personal idiosyncrasy is an important factor. There is a great tendency to produce telangiectases in the treated areas; they should be destroyed immediately with the electric cautery.—(*B. M. J.*)